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AVIATION

The Oldest American Aeronautical Magazine

REQUIREMENTS OF *Intermediate* LANDING FIELDS

THE JOB OF *Selling* AIRPLANES

REGULATING AIR COMMERCE—THE *Medical* SECTION

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The Oldest American Aeronautical Magazine

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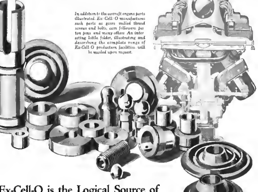

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EDWARD P. WARNER *Editor*

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Glider Regulation

ENTHUSIASM for the glider gains ground rapidly It stands a respected and a welcome member of the aeronautical family It is, in fact in a little danger of that spoiling over-solicitude that traditionally menaces the most lately arrived member of a human family Motorless flight has taken such a hold upon the imaginations of airplane pilots who have tried it that some of them seem almost to have forsaken their interest in the engine-propelled machine Thanks to its natural attractions; thanks to sensational performances in Germany; thanks to the work of the National Glider Association and other convinced and enthusiastic promoters, thanks especially to the active participation of Colonel and Mrs Lindbergh, Miss Earhart, Frank Hawks and other noted pilots, the glider has caught the public fancy. News of gliding accomplishment is eagerly awaited and eagerly consumed. We are reaching the point where an excess of unguided enthusiasm may become a menace There is danger lest uncontrolled gliding experiments by a horde of uninstructed individuals may lead to results so disastrous that a now friendly public will rise up in alarmed revolt Unless control is applied in the right place and in the right manner, with all possible moderation but with determination and promptly the situation may get so out of hand as to call for stringent measures of repression

Regulation of the glider and its operator is urgently needed in the interest of safety Good! How much regulation? What kind of regulation? How applied?

To these questions there is no complete answer Even if it were agreed (which it is not, and we should be the first to dissent from such a proposal) that the regulation of gliders should follow a line strictly parallel to that imposed upon the airplane, with factory inspection supplied and approved type certificates granted after the same fashion the machinery is not at hand for writing airworthiness regulations

To devise even the simplest rules for the structural design of gliders and for the load factors to be used, there should be in the first instance a very careful study of the records of the observations made at Doctor Georgii's remarkable institute for soaring flight research in the Rhön Mountains followed by the prosecution of flight tests and mathematical studies in this country with the co-operation of the National Advisory Committee for Aeronautics So far as we know, no glider has ever carried a modern accelerometer to determine the load that its structure sustained in flight That should be tried, and tried promptly, both in brief training glides and in prolonged soaring flights such as have been made by Mr Bowlus

Without the need of waiting for specialized research, however, some things are clearly apparent Gliders are being built by a considerable number of amateur enthusiasts Some of them are proceeding in complete and horrifying ignorance of the first principles of aircraft construction and of the precautions that it demands We have seen some of them We have seen machines with bracing wires that flapped and with tail surfaces that wobbled crazily in the breeze It needs no knowledge of flight test data on structural loads nor any acquaintance with the niceties of stress analysis, to lead to the decision that those machines ought to be obliterated before they obliterate themselves and their pilots At least so far, the Department of Commerce can go at once. Almost all the important glider clubs are formed near some prominent aviation center, where the Department's inspectors are either regular residents or frequent visitors Glider licensing might well be undertaken, at least as a stop-gap to meet an emergency, upon the basis of a mere superficial external inspection by the Department's representatives to determine whether or not the general appearance and finish justify the presumption of competent workmanship Such an inspection as any one

of the Aeronautics Branch's staff could give in ten minutes should be a prerequisite for licensing. If it be backed by requirements that the glider shall either have been built from blueprints secured from some competent organization or, if from original designs, that the designer shall give evidence at least of knowing what a stress analysis is and of having made some pretense of preparing one, by far the greater part of the structural hazard will be cancelled. Supplement that with restrictions on amateur participation in such abnormally dangerous pursuits as airplane-towed flight, and we shall be able to breathe more easily about the glider's future.

To most people, at least to most of those outside the airplane industry, the regulation of gliders must appear a small problem and a relatively simple one. We live close enough to it to recognize that that is far from the fact.

It presents some novel and perplexing dilemmas to the Department of Commerce, which faces the twin hazards of undue laxity of control and a wave of fatal accidents on the one hand, of undue severity and a stifling of glider development and especially of the initiative of the amateur builder on the other. The second danger is only a little less acute than the first. The glider offers an opportunity of getting the amateur spirit back into aeronautical engineering. Amateur invention worked wonders for radio. It can do much for aeronautics. The Department of Commerce has to corral the sheep apart from the goats, distinguishing between the amateur who knows what he is about and deserves encouragement, and the amateur whose ignorance or unfitness make his activities nothing more than a spectacular and expensive form of self-destruction. We hope to see Secretary Young and his associates equally vigilant against the perils that lie on either side of their true channel. They can depend upon the support of the aeronautical industry for every reasonable measure of control.

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Sir Hugh Trenchard

IN August 1912 a captain in the Royal Scots Fusiliers, learned to fly at the Bristol School at Brooklands, England, and upon graduation was awarded Royal Aero Club Certificate No. 270. On Dec. 31, 1929, as Marshal of the Royal Air Force he vacated the post of Chief of the Air Staff. During that period of seventeen years that man, Sir Hugh Trenchard, Bart., G.C.B., D.S.O., did more for the development of British military aeronautics than any other man in the Empire.

When war broke out in August 1914 it was Sir Hugh Trenchard who was given the task of building up at home a Flying Corps for service on the various fronts. Before the year was out he himself was summoned to France to take command of No. 1 Wing of the Royal Flying Corps. In August 1915 he was appointed to command the Royal Flying Corps on active service, and from that time until December 1917 the success of the R.F.C. in France was his success. At the beginning of 1918 he was recalled from the front and appointed a member of the Air Council, and the first Chief of the Air Staff. His ideas on how to conduct the service and those of Lord Rothermere's, England's first Secretary for State for Air, did not coincide. As a result Sir Hugh Trenchard resigned his post. Lord Rothermere's resignation followed shortly thereafter.

Almost immediately Sir Hugh Trenchard was asked to accept his former post. He was also offered the command of the then Royal Air Force in France. Being a man of sterling character he refused to oust any man who had succeeded him to positions of high rank.

The result was that after consultation with Lord Rothermere's successor, Sir Hugh Trenchard consented to take command of what was later termed the Independent Air Force, a group of bombing plane squadrons stationed in the east of France, as near the lines as possible and working independently of the troops on the ground. He remained in that command until the Armistice, and the work of the units under him is Royal Air Force history that will never be forgotten.

The beginning of 1919 saw him once again the Chief of the Air Staff, and with perhaps an even greater task to accomplish. At the end of the War England had an air service second to none, but like everything else military it was torn apart when peace came to the land. To Sir Hugh Trenchard again fell the task of building up England's third arm of defence, but this time under peace conditions and the fanatical opposition of various factions. The Royal Air Force of today, regarded as being capable of protecting not only the British Isles but the entire British Empire from invasion by any other air force, is the result of eleven years of Trenchard leadership.

To write of the hundreds of incidents that brought out the splendid qualities of the man would be to fill all the pages of this issue. To use two expressions quite common at the time of the War, Sir Hugh Trenchard was a "pukker" officer, and a "brass hat" that everyone respected and admired from the next-in-command to the lowest mechanic. He always had a word of encouragement for the junior officers. He never failed to give credit where credit was due. He had a keen sense of humor that could be appreciated by others. He never gave a command that he would not be willing to execute himself. He did his best for his king and country, and he expected the same high degree of effort and loyalty of those under him. He got it.

And now he has returned to "civies" and a well earned rest from active duty. Just how inactive he will be is problematical . . . the Royal Air Force will always be uppermost in his thoughts.

However, we take this opportunity of offering our congratulations to a great airman for a great service rendered. His record as Sir Hugh Trenchard, "officer commanding," will always stand out in British aeronautical history, and his record as Sir Hugh Trenchard, the man, will always be remembered by those who had the good fortune to serve under him.

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Government Specifications

THE FEDERAL government system of purchasing parts or materials by competitive bidding under established specifications renders a service to aviation that is seldom understood or appreciated by the industry at large. Too often the specification system is condemned by one unfortunate "breakdown," usually more intimately associated with the necessarily complicated nature of Government purchase as a whole or with the inspection personnel than with the specification system itself.

Specifications, properly drawn, provide the basic foundations on which all true progress is reared. A good specification summarizes basic requirements, and the tests necessary to establish compliance with these established requirements.

It encourages fair competition, in that products must meet the minimum requirements before they can compete on a basis of cost. Beyond that, it gives the concern newly entering a given field a worthy objective toward which to strive. For the organization that is endeavoring to better their product, it gives them a scale by which to measure their improvement, and if appreciable improvement is made there is an implied promise to revise the specification to meet the new standard of excellence or performance. To the busy commercial airplane manufacturer, it provides a ready yardstick with which to measure the multitudinous products offered him almost daily.

The preparation of a good specification is not easy. Too detailed a specification, such as one including detail drawings, encourages "cheap competition"—competition which aims only to meet the minimum detail requirements at a minimum of expenditure, regardless of the successful continued functioning of the product or material. Too general or loose a specification introduces opportunities for inferior products to slide in, while the really desired and meritorious product loses out because it cannot compete in price with the inferior one. Writing good specifications is difficult, and those charged with this responsibility deserve the wholehearted support of responsible manufacturers of parts, materials and accessories, not only for the good they do in putting competition in these contributing industries on a practical and ethical plane, but for the assurance to the aircraft industry as a whole that reliable products are to be had by following the governmental lead in defining them.

You're Wrong, Mr. Brisbane

REGARDLESS of all that has been said and written about commercial flying being a business and not a game, a large part of the public still believes that the transport pilot is a man who craves the thrill of battling against the elements; a man with a perpetual gleam of adventure and daring in his eye; and a man who would chance all rather than be called a quitter by his comrades.

As an example of the above we borrow the following from the pen of Arthur Brisbane:

> "A pilot with youth's dread of being called 'yellow' is inclined to risk any weather. At every airport whence passengers depart, the question 'to fly or not to fly' should be left to some solemn person, not a pilot, and one influenced entirely by the passengers' safety."

We can not help but feel that Mr. Brisbane's association with transport pilots has been very limited indeed. Although we have no figures available at this time we feel quite sure that the average age of the pilots employed on transport lines is well over thirty years. We also hazard the guess that at least sixty per cent of them are married men with children.

To those men the job of flying passengers from one point to another is a means by which they can provide for the wife and children at home. They take their jobs with just as much seriousness as the married man who commands the ocean greyhound, or the man who holds the throttle of the "Limited." Upon their ability and judgment rest not only the lives of their passengers, and their own life as well, but the future welfare of those who are near and dear to them. We boast of many transport pilots among our circle of friends, but as far as we know, not one has a desire to leave a widow and orphans to the charity of friends and relatives.

Meteorology is a subject that is included in the transport pilot's training, and although he may not become expert in that work he at least learns how to read a weather map. Once acquainted with what is ahead, the pilot is in the best position to judge whether he should go through or not. The "solemn person" as Mr. Brisbane terms him, may be officially responsible for the plane and passengers, but the pilot is *directly* responsible for the plane, the lives of the passengers, his own life, and the continued happiness and welfare of his family. Refusing to risk bad weather, or turning back, are not evidences of a yellow streak in transport flying. On the contrary they are proofs of sound judgment.

For Mr. Brisbane, score an error—and not for the first time. The American transport pilot is very much of a "solemn person," and personally we would much rather trust our neck on his judgment than on the judgment of all of Mr. Brisbane's solemn persons "influenced entirely by the passengers' safety."

Intermediate LANDING FIELDS

By F. C. Hingsburg
Chief Engineer, Airways Division Aeronautics Branch, Department of Commerce

Although the construction and operation of the municipal airport may claim major attention, it should not be forgotten that intermediate landing fields play a most important part in the profitable operation of an airline. In this article Mr. Hingsburg relates in interesting detail of the requirements, establishment and operation of those spots of ground, the sight of which brings cheer to the heart of the pilot who has to get down in a hurry

AN AIRWAY is a navigable air space over a route provided with air navigation facilities The essential difference between cross country flying and airway flying on scheduled operations on a safe airway is the ground facilities provided along the route to enable the flight to be continued under conditions of poor visibility by radio direction and communications or to provide for safe landing to await better weather A daytime airway should be provided with suitable intermediate landing fields and current weather information made available to the pilot by radio. For night flying the airway should be equipped with boundary lighted intermediate fields, airway beacon lights, radio range beacons and current weather data compiled from observations along the route and made available to the pilot by radio

Air navigation facilities on civil airways require intermediate landing fields approximately 30 miles apart to provide for the landing of airplanes under conditions of stress of weather or in the event of mechanical difficulties. The national airways are provided with landing fields on this basis. Under the Air Commerce Act appropriations for air navigation facilities are made available to establish, operate and maintain along civil airways all the necessary air navigation facilities except airports. Airports located along the route are considered to provide the necessary landing facility, and intermediate landing fields are only established where landing fields and airports are non-existent

Intermediate landing fields established and maintained by the Federal Government are occupied under the terms of a license providing for the right to carry out construction work incidental to the establishment preparation and operation of the landing field, the right of the aeronautical public to use the facilities with rights of ingress and egress and other privileges consistent with the purpose for which the landing field is established The license provides for occupancy for a term of years and renewable thereafter on a year to year basis The license does not cover the privileged use of the field for purposes other than landing of airplanes under conditions of emergency and, therefore, the consent of the owner is required for the use of the field for purposes outside the scope of the terms of the license

Other things being equal the sites for the intermediate landing fields are selected in the vicinity of communities for the purpose of establishing co-operative landing fields, in accordance with the established practice of the Department which may, at some future time develop into public airports The community is expected, under these circumstances, to obtain a suitable tract of land by lease or purchase and to license the site to the Government at a nominal consideration The grading and conditioning of the field is usually undertaken by the local community through its local government or local representative civic organization With the establishment of intermediate landing fields on this basis the Federal Government installs the necessary lighting equipment and maintains and operates the field under the intermediate landing field rules of the Department of Commerce until such time as the local community can take over the field and operate it as an airport

INTERMEDIATE landing fields established by the Federal Government with or without the co-operation of the local community are intended for emergency use of the flying public. Regular and commercial use of the intermediate landing field by a fixed base operator is never permitted A flying school cannot be maintained and permission must be granted in each instance for the use of the intermediate field for a limited period of time on specific dates provided it is shown that the use of the intermediate field is in the public interest Permission for the use of intermediate landing fields will be granted subject to the approval of the property owners and the approval of the district office of the Airways Division responsible for the maintenance of the field and only on condition that the operator will place the field in the same condition in which it was found, the operator being liable for all damage incurred in connection with the use of the field

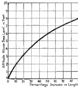


Fig I Required increase in length of landing area at altitudes above sea level

Intermediate landing fields are located as close to the airline course as possible although at many locations where landing fields are not available the lights are laid out on a straight line with the landing fields several miles on either side of the axis of the course The landing field should preferably be on a highway or at least accessible to a good road to provide for emergency transportation Locations are selected which are accessible to commercial power and telephone lines so that extensions can be made at a reasonable cost to the intermediate landing field

THE IDEAL SHAPE of an intermediate landing field is square, triangular or circular, which permits landing in any direction against the wind, but such fields are not readily found or available on routes passing over all types of terrain Other shapes of intermediate fields are therefore used and are of the "L," "T" or "X" shape The length of the runways or landing strips should be from 2,000 to 3,000 ft., especially in the direction of the prevailing winds and should preferably not be less than 500 ft in width so as to accommodate the large airplanes now in use At higher altitudes the size of the intermediate field should be increased in accordance with the curve in Fig 1 Intermediate landing fields should preferably have clear approaches on all sides An obstruction to the approach cuts down the effective length of runway from 7 to 10 ft for each foot of height of the obstruction

Intermediate landing fields should be as nearly level

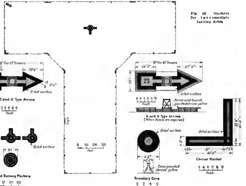


Fig II Markers for intermediate landing fields

as practicable and have uniform surface without abrupt changes. The field should be free from ditches, rocks dead furrows or any irregularities which would be hazardous to aircraft in landing. Natural drainage is of vital importance to prevent getting soft in wet weather. At certain seasons, muddy or sticky fields would prevent taking off after a forced landing. Intermediate landing fields are usually selected so as not to require artificial drainage as this is expensive. Landings on the intermediate fields are infrequent, and, therefore there is usually no necessity for special surfacing. The ordinary crops of grass native to the particular vicinity are usually sufficient protection against the drifting of soil by wind and its washing by water. In many instances, it is less expensive to scrape the surface periodically than to establish a sod cover. It has never been found necessary to oil intermediate fields. This process is expensive and maintenance funds for doing the work in this manner have never been estimated and, therefore, not appropriated. The oiling of a landing field would also be subject to the approval of the owner and the conditions of the lease as permanent injury to the land may result from such practice. It is impracticable to obtain landing fields which do not require some conditioning and surfacing. The average cost of placing intermediate landing fields in condition is about $1 500 per field. In many instances, especially in mountainous locations, greater expenditures are incurred. The maximum cost of conditioning a field was in connection with the Blue Canyon intermediate field located at an elevation of 5 300 feet in the Sierra Nevada Mountains on the west side of the slope, and the cost of cutting timber, removing stumps, grading and conditioning was approximately $14 000. Fields without obstructions on the adjoining property should be selected wherever practicable, but where unavoidable they should cover a minimum length of boundary and, if possible, be grouped on one side leaving other approaches clear. Trees should be removed for a distance of about 500 ft. from the border of the field and the trees are purchased from the owner and removed by contract. There should be no high hills or bluffs so close to the field as to block approaches.

Corners and angles of the landing fields are marked by corner markers which are painted yellow, blocking out the shape of the field, and making it possible for the pilot to determine without difficulty the boundaries of the prepared intermediate landing field. In order that landing fields may be easily picked up and identified from the air, ground markers are installed at the center of the field. Runway indicators, 4 ft. wide and 30 ft. in length, are installed showing the direction of the best runways and landing strips. The directional arrow at the base of the tower points the direction of the airway course. Broken stone or gravel is used for the airway markers and the surface is sprayed with yellow paint. A border of black is obtained by spraying the ground surface with road oil confined to the shape as shown, and this prevents the growth of grass, making the markers more easily distinguishable from the air.

A wind cone is usually mounted on a bracket on the side of the airway beacon tower showing the direction of the ground wind. At night the wind cone is lighted internally, the light showing through the fabric of the wind cone. Intermediate fields are marked with a standard type airway beacon usually mounted on a 51 ft. skeleton tower. The boundary of the field is marked by white lights on low boundary standards spaced 200 to 300 ft. apart, so located as to show the pattern of the field from the air at night. Green lights are mounted to show the best approaches to the landing field and red lights in the boundary lighting circuit indicate that there is no clear approach on that side of the boundary. Red lights are placed on all obstructions. Fifteen-watt lamps are used for white boundary lights and 25-watt lamps are used for colored lights. Metal boundary cones are used in conjunction with boundary standards so as to prevent collision and outline the field for day use. Refractive globes are used in connection with the boundary lights to increase the effectiveness of the boundary lighting system. Where commercial power is not available, the boundary lighting system is operated on gasoline generators.

The intermediate landing field rules provide that all aircraft pilots and the aeronautical public must comply with the Air Commerce Regulations and landing field rules promulgated by the Department of Commerce. The fields are established to provide safety of the aeronautical public in cases of emergency and no exclusive preferential privilege or commercialization of any intermediate landing field will be permitted. An airplane making a landing has the right of way over airplanes moving on the ground or taking off. Upon landing the airplane shall be taxied off the landing area to a location that will not interfere with or become a hazard to an airplane that may find it necessary to make an emergency landing without warning. The take-off or taxiing shall not commence until there is no risk of collision with landing aircraft. No airplane shall be refueled while engine is running, and no engine shall be started unless the pilot or other competent person shall be in the cockpit attending the controls and the usual system of signals and challenges understood by the operating personnel. Landings and take-offs where practicable shall be made into the wind and shall not be over dwellings, obstructions or parked cars unless unavoidable. In making test flights of aircraft subsequent to a forced landing, personnel making such flight will be limited to the number required to perform the required test. Unhoused aircraft shall be parked in the space allotted and shall be properly secured by ropes and stakes and when left unattended over night, shall be properly lighted to prevent collision by other aircraft. The caretakers employed by the Department of Commerce will render accident reports covering all accidents occurring on the field. All visiting pilots are required to report immediately to the caretaker to register and furnish information as to the cause of the landing and use of the field.

The Department of Commerce has established 285 intermediate landing fields, the total acreage for landing field purposes totaling approximately 21 000 acres. This represents an average of 75 acres per landing field. The rental paid for landing fields is over $100 000 per year, the average price per acre being about $5. The total number of boundary lights maintained in the United States is approximately 7,000 which is an average of approximately 24 boundary lights for every field. There are usually five red lights marking obstructions on every landing field, making a total of about 1,300 obstruction lights maintained in the vicinity of landing fields by the Department. There are 120 lighted municipal and commercial airports along the lighted airway routes in addition to the intermediate landing fields installed and operated by the Department of Commerce.

THE *Salesman's* JOB

A Few Timely Comments Regarding the Task That Confronts Those Who Desire to Sell Airplanes

By Karl E. Voelter
*Curtiss Wright Flying Service
Sales Promotion Manager,*

A YOUNG CHAP recently walked into our office and stated that he would like to sell airplanes.

"Are you an airplane salesman?" was our first question.

"No," he replied, "but I can sell anything, and I certainly can sell airplanes."

Further questioning revealed that the young man never had been in an airplane, but, attracted to the industry by its unquestionable glamor, had decided without any preparation at all that his sales ability would meet with instant recognition and that he would be employed immediately for one of the most important positions in the aircraft industry today.

If everyone were as airminded as the hosts of young men who come to us seeking sales positions, and likewise possessed sufficient means to invest in an airplane, then airplane selling would simply be a matter of making deliveries at specified times, and the salesman would be a mere order taker. However, airplane selling requires far more than that. It calls for more, even, than the knowledge and ability possessed by the average "high pressure" automobile salesmen who daily apply for sales positions with us.

It may be stated right here without reservation that the modern successful airplane salesman not only must know all the fundamentals of flying, but also must be a psychologist of a high order, for the merchandising of airplanes at present involves the merchandising of psychology to its fullest extent. In other words, the salesman must sell aviation in general to the prospect—must make him air minded—before he launches into the task of selling any particular airplane.

To this end the larger manufacturing and distributing companies, such as the Curtiss-Wright group, already have spent many thousands of dollars and know they will have to spend many thousands more selling aviation and building up air mindedness before they can attain the ideal of "just selling airplanes" in the routine manner that the automobile dealer sells cars.

Naturally, then, the problem of selling airplanes starts with the conversion of the general public into an air-minded public, and in this direction we are accomplishing results. The Curtiss-Wright Corporation and other large manufacturing and distributing groups have constantly encouraged their officials to speak at luncheon clubs and at formal and informal gatherings of all descriptions, knowing that, although they could expect no immediate revenue from such efforts, they were laying the cornerstone of future sales not only for themselves but for the industry in general.

The Curtiss-Wright Flying Service, a unit of the Curtiss-Wright Corporation, maintains an airplane showroom at 27 West 57th St., New York City. This showroom was opened as a sales laboratory, and its institutional value is rated above its income producing possibilities. The salesmen on the floor are selling airplanes, as well as accessories, flying school courses, charter transportation and aerial photography, but one of their important functions has been to sell aviation to the people from every walk of life who enter.

Everyone engaged in this task knows that he is aiding his competitors as well as himself, but that is part of the missionary work required of the industry.

Many of us remember the time when people would not ride in an automobile. Such an idea would be laughed at today. A similar thought, however, is voiced by persons who say they want to fly if they can keep one foot on the ground. If we can get these people through their first hop, the majority of them become flying enthusiasts. It has often been true that those whose doubts about flying are overcome by a demonstration of its comfort and safety become its strongest advocates. We regret that we are unable to offer airplane rides to all the world, for such promotion would yield gratifying results.

Upon the industry, and, therefore, upon its salesmen falls the task of infusing into others our own belief that we are selling transportation which has no peer. Before the average salesman can regard the airplane as "just another high priced specialty," the highly trained airplane salesman must first sell the idea of flying. Until the public becomes air minded, the airplane salesman must possess more than general sales ability. The airplane salesman of today, with his specialized aviation training, must pave the way for the "high pressure" salesman of tomorrow.

REGULATING *Air Commerce*

ARTICLE V—MEDICAL

By
L. H. Bauer, M.D.
Medical Director, Aeronautics Branch
and
H. J. Cooper, M.D.
Assistant Medical Director, Aeronautics Branch

For those persons who have failed to pass the physical examination for a pilot's license, and have gone away firm in the belief that they can learn to fly an airplane, this article should be of considerable interest and value. ¶In a manner which should be convincing to even the most skeptical, Doctor Bauer and Doctor Cooper point out the many reasons why the physical examination is a very important factor in the matter of learning to fly, and continuing to fly thereafter. ¶The sixth and last article of this series dealing with the licensing and inspection work of the Aeronautics Branch will appear in the next issue, and deals with the subject of aircraft accidents

PHYSICAL STANDARDS for airplane pilots have engaged the thought of interested physicians for about 15 years At the beginning of the war there were no standards other than those for entrance to the military service It was found that many deaths and accidents resulted from this standard, or rather, lack of standard Consequently a rather rigid physical examination was adopted and constant medical supervision of personnel instituted As a result the percentage of accidents due to physical causes was reduced to a minimum


Dr. L. H Bauer, Medical Director Aeronautics Branch

This high standard has been in vogue so long that inquiries are often made as to whether or not it is necessary There seems to be a desire to go back and live again the bitter experience of too lax a standard

As examples of fatalities and accidents due to physical causes, the following authentic cases may be cited

1 A pilot, who, while convalescent from influenza and in poor physical condition flew contrary to the advice of a medical officer and was killed

2 Two pilots with defective depth perception who, in landing in strange fields misjudged their distance badly One was killed and the other washed out his plane

3. The student known to be subject to fainting attacks (unlicensed as student), who "passed out" in the air and was killed

4 A pilot known to have badly defective vision who flew without medical approval and had a collision in the air with another plane which was trying vainly to keep out of his way

5 A pilot going up for a "check" flight again without medical approval, who, it was shown had numerous momentary lapses of consciousness, jammed his stick in backwards (even having to hammer it in place to do so) in such a way that the pilot in the other seat was unable to get the plane more than a few feet in the air and crashed, fracturing his jaw and knocking him unconscious

The development of commercial flying allowed us opportunity to set a lower standard for private pilots in accordance with the standards for the same type of flying in Europe In some ways our standards for the private grade are even more lax than is the case in Europe These standards have now been in force long enough to warrant a study being made of their effect Hence, one of us (H.J.C.) suggested a study of student pilots to determine what effect, if any, physical defects had on an individual's ability to obtain a pilot's license

Before discussing this it will be well to discuss certain physical standards that perhaps seem least obvious to the layman in their relation to flying

One question that comes up frequently is why the Department does not accept a student regardless of his uncorrected vision, if his vision can be corrected to normal The answer is that the flyer's situation is quite different from that of the man on the ground who is concerned chiefly with straight-ahead vision The wearing of glasses under goggles is prohibited because the man is looking through two panes of glass, which, in itself diminishes visual acuity, and his vision is corrected only when looking straight ahead He has blurred vision at the sides The same applies to only a slightly less extent if he wears glasses in a cabin plane Furthermore, if the windshield becomes misted, and he opens the window his glasses become misted also and he has to remove them, thereby reducing his vision to a useless state


Dr. Harold J Cooper Asst Medical Director Aeronautics Branch

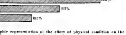
Now what about corrective lenses in goggles? It is difficult to grind corrections in goggles, and high corrections required for high refractive errors cannot be so ground Inserts are placed in the lenses, again giving the man two panes of glass to look through and again restricting his vision to the field straight ahead Supposing the lenses can be corrected satisfactorily the wearer likewise is in difficulties when his goggles become misted or smeared with oil and have to be removed Hence the Department declines to accept any student who is entirely dependent on his correction to see

All pilots are now familiar with the depth perception apparatus, which tests a man's ability to judge distance. That a pilot must judge distance constantly is well-known and need not be explained here This ability depends largely on what is known as binocular vision—the ability to use the two eyes in co-ordination The apparatus with the movable and fixed rods tests this function of the eyes One's ability to pass this test in the vast majority of cases is closely akin to his ability to land a plane satisfactorily provided of course he has the technical ability

The tests of eye muscle balance perhaps, on the surface seems to the layman as farthest removed from any relation to flying These are the tests with the line and light, and the fusion of two lights with prisms in front of the eye In the normal person the muscles controlling the movements of the two eyes which work in pairs are properly co-ordinated In abnormal cases they are not so co-ordinated and single vision is maintained by effort or not at all If the latter, the man is definitely "cross-eyed" or "cock-eyed" If the former, it can be detected only by careful tests This constant effort to maintain single vision is fatiguing and fatigue causes an endless chain of symptoms that may result in accidents Actual double vision may occur These abnormalities are also conceived with poor judgment of distance Not infrequently we find that a man's vision is normal, his judgment of distance borderline, or even disqualifying, and on checking his eye muscle balance we find an abnormality which, when corrected, results in improved ability to judge distance

Pilots often wonder why stress is laid on color vision They realize that navigating lights on planes are red and green and know that obstruction lights on the airport are red and certain signal lights are colored but beyond this they see no reason for it Signal panels are frequently colored also but most important of all is the fact that the different shades of green and brown on the ground indicate the character of the terrain and aid the pilot in picking out an emergency landing field

The testing of visual fields with the perimeter is important because it tests the ability of the individual to see out of the "tail" of his eye when looking straight ahead The testing of the fields for color bears a relation to the sensitiveness of the peripheral part of his retina and often is associated with ability to see at night



Graphic representation of the effect of physical condition on the ability to progress in flying A—No physical defects; B—Minor physical defects; C—Major physical defects (not disqualifying); D—Disqualifying defects (waived) Figures show the per cent in each group progressing to private or higher grade of license.

Defects and diseases of the ear nose and throat are made worse by exposure and fatigue and render the pilot subject to physical deterioration

The general physical examination is to determine the presence or absence of those conditions which might render the individual incapacitated in the air or interfere with safe functioning under flying conditions

The examination of the nervous system involves a number of questions that on the surface bear no apparent relation to flying These questions are asked however, in an effort to determine the stability of the individual his reaction to strain and stress as evidenced by his past behavior and his quickness of response to stimuli, so that those who are slow reactors who are unable to cope with emergencies or are unstable generally may be eliminated The purpose of the balance of the examination is self-evident and needs no discussion here

That a man who cannot meet our physical standards may still learn to fly is granted, but that the hazards are

increased in his case cannot be doubted Furthermore, that he has a greatly decreased chance of even becoming a pilot, in accordance with the seriousness of his defects, is evidenced by the following discussion of the relation of these standards to ability to become a pilot.

Numerous criticisms of the Physical Standards for Airplane Pilots as adopted by the Department of Commerce, having arisen, particularly as to their being too arbitrary, it was decided to correlate them with actual results in student pilots

Our complete file was gone through by H J C and the records of all those who had started in as students 13 months or more previously or who obtained a pilot's license in less time, were studied Thirteen months was adopted because a student permit is good for one year One month was allowed in addition to cover the time necessary to get flight tested, etc Only students were selected in order to eliminate the effect of previous training The idea of the study was to determine what percentage of students with and without physical defects reached a higher grade There are many factors determining this For example, a student may lose interest, he may be unable to go on for financial reasons or he may be unable to learn to fly for other than physical reasons Inasmuch as all these factors affect all groups equally they may be disregarded as having no effect on the statistics compiled A total of 9,103 records were studied The only basis of selection was that mentioned above, namely, that they must have started as students at least 13 months previously, or have obtained a pilot's license in less time All such cases were selected so that the study represents all material available The number studied is sufficiently large to warrant drawing deductions.

These cases were then classified as follows: The first group consisted of those students having no physical defects, of whom there were 7,660

The second group was composed of those students having no physical defects, who eventually received a pilot's license, namely, transport, limited commercial, industrial or private Of these there were 2 684

In other words 35.4 per cent of all students without physical defects eventually obtained at least a private license.

In the third group were those students having minor physical defects which, while disqualifying for transport grade, are not disqualified for private or industrial licenses Such defects as 20/30 vision, slight defects of the vascular system minor defects of the ear, nose and throat and color vision, etc These defects, prior to this study, had not been considered by us as having any bearing on an individual's learning to fly, but as foci of future trouble or causes of disabilities arising later In this group there were 999 cases Of these 303 eventually reached at least a private grade, or 30 3 per cent In this group we included minor defects of color vision The results of this study have suggested to us that minor defects of color vision may be of no importance and hence these cases should perhaps appear in the first group However, inasmuch as it is a minor defect, these cases have been left in the second group This group demonstrates that in spite of these being minor defects, they apparently decreased the individual's chances of gctting even a private license, even though they were not disqualifying for a private license

The fourth group was composed of those having major physical defects still qualifying for a private license, but disqualifying for a passenger-carrying grade Defects such as 20/40 or 20/50 vision, gross defects of the ear, nose and throat, slight restrictions of function in the extremities, certain minor disorders of the nervous system not serious enough to disqualify, were among those listed This group it was expected would have more difficulty in learning to fly and the results of the study confirmed this There were 404 cases in this group and 75 eventually received at least a private license or only 18 5 per cent

The fifth group consisted of those who had defects that were disqualifying for all grades, but who for some reason were allowed to fly Usually, the reason was because the examining physician issued him a permit in error and on the basis of it the man spent considerable money before he was notified of his disqualification In each such case the man was promised an opportunity to get a private license Yet of 40 cases in this group only 5 received a private license or better, and one of these was killed almost immediately after receiving a private license The cause of his fatal accident was unquestionably due to his physical defect Hence really only four cases ever got anywhere or a total of 10 0 per cent

Doubtless were 18 months or a year set as the time limit a higher percentage would obtain their licenses, but this would affect all groups equally and there is no reason to suppose that the ratio between the groups would be in any way altered

As a matter of fact those in the last group had fewer factors, other than physical, operating against them than did the other groups They were all men known to be intensely interested in flying and who actually began training, so none of them dropped out because of lack of interest or presumably for lack of finances. Hence we might expect a higher percentage here and yet it is distinctly lower

From this study of over 9,000 cases, it certainly would appear beyond question that a man's physical condition bears a direct relation to his ability to learn to fly Hence, it would also appear that a man is taking a long chance in starting training unless he can pass the transport physical examination If he barely passes the private grade, his prospects of getting anywhere are almost cut in half If he cannot pass the private grade it would be useless to consider him for a waiver as he has not over one chance in ten of ever progressing

This study has in our opinion vindicated the standard set by the Department as not being too strict and further indicated that the standard for private grade is possibly too lax It has still further supported our belief that waivers should never be granted students While there will always be individual exceptions to any given rule, this study conclusively indicates that as a group, men with physical defects have a chance of becoming pilots that steadily decreases with the seriousness of their defects

We have decided that a further study is warranted with a view to investigating the effect of specific physical defects on flying ability, rather than physical defects as a group Certain defects may be of no consequence and tend to raise the percentages Others may be more serious and tend to lower them This study will be made in the course of the year and we shall then have available about 20,000 cases instead of 9,000

Design IN *1930*

Concluding the Symposium by Leaders in the Industry on 1930 Airplane and Engine Design Trends

In ORDER to provide an indication of the design trends in the aviation industry during the coming year, questionnaires were sent out by AVIATION to leading executives and engineers in aircraft and aircraft engine manufacturing companies, as well as to a number of other recognized authorities We were fortunate enough to secure many more answers than we had space for in the special issue of February 15, devoted to the St Louis International Exposition Many were published the following week The remainder appear herewith

The following questions, given in slightly abbreviated form were asked leading engineers in charge of airplane design

1 What is the general trend of design likely to be and in what phase is greatest progress likely to be made?

2 How much further evolution is to be expected in the design of very large planes, and what prospects are there for immediate production of largr planes?

3 How much increase is there likely to be in the use of aerodynamic novelties and striking departures from accepted form, such as the slotted wing?

4 Which way will the weight of favor swing in the controversy between cantilever and externally braced wing trusses?

5 Will unit wing loading continue to rise?

6 Are aspect ratios likely to increase, decrease, or remain approximately the same, on the average?

7 Will metal construction tend to replace wood and if so, how rapidly?

8 Will metal construction continue to be predominantly of duralumin, or will alloy steel strip gain favor?

9 What developments are to be looked for in the near future in landing gear design?

Thick Airfoil Sections With Smaller Center of Pressure Travel—Superchargers—Magnesium Alloys

By JEAN FRADISS
Structural Engineer, Fokker Aircraft Corp

There will probably be an important improvement in the structural end of aeronautical construction, due to the use of better materials, especially in the line of light alloys, no doubt the ships will look somewhat cleaner, designers understanding that something which does not look good is not good, but the greatest improvements to come are certainly of an aerodynamic nature, because this science is yet so little known that anything is to be expected

Of course the development of aviation in the near future will also be a direct function of the progress of the power plant

2 I do not think that responsible companies will design much larger ships than the last creations—not because of difficulties in realization, but on account of economic problems yet unsolved

3 As far as aerodynamic novelties are concerned, the field is so immense and so uncertain that it does not seem wise to express an opinion

4 The monoplane type of construction has decidedly won the battle against the multiplane, and now the cantilever type will gain favor with the public completely

The actual thick wings do not present any advantage so far as weight is concerned, but they have as good aerodynamic characteristics as thin wings and are far more efficient, and the future thick wings will be even better as the airfoil design is perfected

Thick tapered wings will be designed with a very small center of pressure travel and a small moment coefficient, thus increasing their inherent stability and reducing their deflection, especially when rigid covering is used Ships equipped with such wings will need but small tail surfaces

5 The unit wing loading will probably increase to gain speed while some device will be provided to ceduce

landing speed Wings with variable area and camber are likely to be perfected

The really important improvement which will increase the speed with the present type of equipment will probably consist of flying high to fly fast Supercharged, over-compressed engines with automatically adjustable pitch propellers perhaps reduction gears with several speeds, and variable wing area may solve the problem and revolutionize air navigation, in which the radio will play a dominant part.

6 Change in aspect ratio is intimately connected with the improvement of the materials used for the wing construction

7 Both metal and wood construction are likely to be used and improved as up to now neither type has been proved decidedly superior to the other It seems to depend upon the particular case

8 It is almost certain that the use of duralumin as compared to alloy steel strip will continue to be more widespread, for airplanes constructed in the near future The discovery of light alloys with high mechanical properties is to be anticipated as research in this direction is being carried out in many European laboratories

We may also confidently look forward to the perfection and protection against corrosion of the present magnesium base alloy In either case the improved alloy would replace duralumin because it has a much better strength/weight ratio and is very easy to work

9 Further progress of oleo or oleo-pneumatic, or oleo spring shock absorbers at the expense of the rubber cord type is to be expected during 1930

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Work for Safety—Research on Ultra-Light Alloys

By CHARLES HEALY DAY

President and Chief Engineer New Standard Aircraft Corp

THE CHIEF PROBLEM now confronting the manufacturer and the engineer is to supply the consumer with the product which the consumer's experience leads him to demand Until recently, the engineer dictated the trend of design according to his individual ideas

Charles H Day

The airplane, after all is just another and improved method of transportation and, as such must and will be taken out of the spectacular novel and super-man class

As all other important transportation vehicles have been perfected through the dictates of extended use, so also must the airplane be developed primarily by the operator and user, the engineer being relegated to his rightful position of finding ways and means of supplying what is most needed rather than developing novelties which may or may not be useful

No matter how optimistically we may view the present airplane transportation situation that which holds back the acceptance of air transportation by the public still is —as it always has been—fear

Safety of operation therefore is the predominant issue, and until more frequent landing fields are available safe operation is possible only with airplanes having a relatively low landing speed and an excess of stability and controllability

The public will never consider a means of transportation entirely safe in which motor failure means possibly serious injury or death Take away anything that might be spectacular and how many of us would make frequent trips of hundreds of miles in an automobile if reliable as it is motor failure meant running the danger of serious injury or death?

The public is demanding safety Therefore, it is to be expected that the general trend of design will be toward greater structural strength, a disposition of loads which will cause the least injury to occupants in case of crash, greatly improved stability and more effective controls

Improved performance will come with cleanness of detail increased aspect ratios and in some types by the use of highly tapered cantilever wings, rather than by a sacrifice of landing speed through increased wing loading

In almost any of the existing types of airplanes a relatively enormous increase of stability and controllability is possible without the use of auxiliary devices of any kind and without detracting materially from maneuverability or all-around performance

Also, with the present knowledge there is no excuse for the design and manufacture of any airplane which has bad spinning characteristics. It is easily possible without auxiliary devices, to manufacture airplanes which cannot be spun, but it is believed this would be undesirable because of the suspicion that such planes might spin without recovering

Improved stability and controllability will be combined with wider wheel treads and softer landing gears It is regrettable that many airplanes, because of lack of these essentials are incapable of getting safely into landing areas which are justified by their wing loading An improvement in these items is inevitable

Development of aerodynamic novelties will continue of course but until the present types of airplanes are more nearly perfected according to the knowledge which has been available to all engineers for years, the use of such novelties is not justified The development of the slotted wing and similar devices is to be commended but not as an attempt to improve an inherently poor design

Because of lack of experience with the larger of the existing types of airplanes it is doubtful if responsible manufacturers will in the immediate future attempt airplanes of much greater capacity than those now existent

The use of metal in airplane construction must continue to increase Although its use for all parts of some types is not now justified structural strength and production economies demand that eventually practically all airplanes will be of metal The light metal alloys will predominate over steel because of the better form factor available The development of magnesium alloys and perhaps beryllium alloys has interesting possibilities for the same reason

To summarize (1) The engineer of tomorrow will design what the purchasers demand, not what he personally likes (2) he will put more safety into his airplanes; (3) he will improve performance by improving design rather than by sacrificing low landing speed; (4) he will experiment with novelties but will not fall back upon them in attempting to improve inherently poor designs (5) he will move carefully in increasing the size of his new aircraft; (6) he will gradually adopt light metal alloy construction because strength of structure and economy of production demand it

Higher Aspect Ratios for Stability—Effects of the Airwheel

By ALBERT S. HEINRICH

Chief Engineer Aeromarine Klemm Corp

KEENER COMPETITION will force designers and manufacturers to give more attention to aerodynamics and there will be a general trend toward cleaner and less wasteful design in order to obtain better performance More attention will be given to structural design in order to produce structures of lighter unit weight and more uniform strength throughout the entire structure There will be a general tendency to favor airplanes designed by competent, experienced engineers and designers and built by responsible manufacturers and there will be less encouragement given to "Barnyard" engineering and inexperienced designers

Nineteen-thirty will no doubt serve as a good barometer to indicate to what extent the traveling public will take to the air as a means of transportation Encouraging transportation figures will serve to induce responsible manufacturers to produce larger passenger carrying airplanes in order to reduce operating expenses of the transportation lines

Experimental development of variable lift wings will probably be carried further this year than ever before, since it is more evident, as the practical application of the airplane as a means of fast transportation is put into effect that a high top speed is necessary in order to maintain schedules against strong head winds and still planes must have sufficiently low landing speeds to make a landing safely in a small field in case of necessity

There will be no general trend toward either full cantilever or the externally braced wings as both seem to meet with equal favor among the designers

Unit wing loadings are as high now as they will go for some time on commercial airplanes, unless higher lift wings are developed, since many crashes are due solely to high landing speeds Increased top speeds cannot continue at the expense of landing speeds

Increased demand for stable airplanes will no doubt tend to influence the trend of design toward somewhat larger aspect ratios

Metal construction will be greatly increased particularly by the more experienced manufacturers I look forward to a much greater use of heat treated steel structures The use of duralumin and other aluminum alloys will continue to increase in airplane structures and the demand for these alloys will no doubt be effective in lowering the price of material as production increases

The use of airwheels with modified shock absorbers will be conducive to softer landings and tend to reduce stress in the structure Somewhat wider treads will no doubt be favored by some designers and there will probably be a general tendency toward low wing monoplanes, particularly in the light plane class, with general effort to keep the vertical position of the C G as low as possible to reduce the possibility of nosing over

Accidents due to faulty design, both structurally and aerodynamically, will be gradually lessened as there will undoubtedly be a tendency toward a closer check on all designs and structures, even in experimental airplanes The aircraft industry cannot continue in a healthy condition unless the inexperienced element is practically eliminated

The weight of public favor will only be thrown to the support of the airplane as a means of transportation after consistent performance and reduction of accidents has proven its worth and instilled confidence in it as a fast reliable and safe means of travel

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Safety and High Performance—Go Slow on Metal

By WILLIAM WAIT, Jr.

Chief Engineer Berliner Joyce Aircraft Co

IN CONSIDERING the trend of aircraft design it becomes apparent that it is not reasonable to expect anything in the near future that will materially change the general concept of the airplane as it exists today

It is highly probable that we shall see a considerable increase in the number of large seaplane designs similar to the DO X as apparently large boats of this type are the only ones which have any hope of survival if forced down on rough water It is possible to utilize these huge designs as seaplanes since take-off and landing areas are more or less unrestricted but it is not reasonable to expect to see their equals in size as landplanes, due to the landing and take-off problems involved

Wm. Wait Jr

The development of the amphibion type plane is receiving a great deal of attention and it is to be expected that an increasingly large number of planes of this type will be offered to the public

We may expect a steady and more or less rapid advance in all devices tending toward the increase of safety of flight These are necessary in order to provide the increased market which we must have if aviation is to progress, and it must progress if we, in the aeronautic industry are to survive.

The rapid increase in the number of planes flying daily at all airports is placing an increasing premium on the ability to see in all directions and will require a considerable increase in the vision afforded by most of the present enclosed types

It is improbable that any great increase may be expected in the number of planes equipped with slotted wings due to the involved situation which exists as regards the patent rights

The develoment of the floating aileron, due entirely to the foresight of one of the country's best known aerodynamic experts, was probably the most outstanding result of the Guggenheim Safe Aircraft Contest and its use may shortly be exected to become more or less general where slow controlled flight is of such paramount importance as it is in passenger transport

There seems to be a tendency to get away from the very small light type of airplane which seemed very much on the increase a year ago The automobile industry went through the same experience with the cycle-car It is important to provide high performance with any vehicle of transport if it is to become popular and where lack of power involves lack of safety as it does in the airplane, the performance becomes necessary

Structural modification such as the increased use of metal throughout the entire airplane is to be expected The use of metal in particular is becoming increasingly important because of the rapid exhaustion of the avail-

able wood supply. It is, however, considerably limited at present because of the expense involved in the built-up structures required where any attempt is made to keep weight at a minimum. The use of duralumin in particular involves a great many difficulties, and it is to be expected that metals or alloys will be evolved which will make possible the use of modern automatic welding processes or other methods which will eliminate the highly expensive repetitive hand operations now necessary.

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Still Higher Performance and Easier Maintenance

By JOSEPH S. NEWELL
Ass't Professor of Structural Engineering Massachusetts Institute of Technology

PERHAPS THE GREATEST PROGRESS in aeronautical materiel during 1929 has been occasioned by the almost universal demand for higher speeds and increased performances. As evidenced by the widespread use of resistance reducing cowlings and by the general cleaning up of exposed details, designers have obviously made a definite effort to utilize to their utmost all improvements which enhance performance and permit the full utilization of the increases in power plant efficiency made available by the engine manufacturers. In these efforts they have achieved a considerable success and it is to be expected that 1930 will see still further advances.

It is also anticipated that more thought will be given to the design of those details which require maintenance in service. At the present time an inordinate proportion of the costs of operating commercial aircraft arises from the correcting, adjusting, or replacing of small parts which are subjected to wear. Such costs must be eliminated where possible and this coming year should show definite results from the efforts to remove or reduce them.

The large production programs laid out and followed during the past year demonstrate the desirability of all-metal construction for airplanes. Nineteen thirty will undoubtedly see definite progress toward the solution of the engineering problems inherent in metal spar and fuselage design. While no startling developments are anticipated, it is only to be expected that, with the most competent of its engineering departments engaged in research programs, the industry will advance far toward the ultimate solution of these problems. The conscientious and painstaking efforts exerted by many manufacturers to determine facts and to obtain data which will permit the rationalization of methods of analysis and design are indicative of the sound development to be expected. It is also auspicious that the more progressive designers are not committing themselves to all-metal projects depending upon the inadequate and in many cases, admittedly fallacious data which are available at present without subsequent efforts to obviate structural failures by static tests of entire airplanes.

The present year should, therefore, bring about a sound development of all types of aircraft with a trend toward those types which are inherently clean in design and from which high performance may be obtained with minimum operating costs. The Guggenheim Safe Aircraft Competition having established the futility of attempting to accomplish the impossible, it is not anticipated that the more competent designers will depart very far from the present types of wing and fuselage structure.

Progress Along Conservative Lines

By THOMAS CARROLL
Technical Adviser, Federal Aviation Corp

DEVELOPMENTS in the aviation industry during the year of 1930 will be largely dependent upon the conditions which have been created by the very thorough shake-down which the industry has had during 1929. It is already beginning to appear that some of the occurrences during the past year, which have been almost tragic in some instances, will in the long run prove a benefit. Necessity will demand a greater usefulness and productibility.

Usability is the predominating feature of aviation which must be stressed right now. Every activity in aviation, design, manufacture and operation, must be carefully considered from the point of usability.

For any particular assignment, whether in transport, schools, pleasure or sight-seeing, it is obvious that a specification can be laid down for an airplane which will best perform that function and for which a certain existent or contemplated type, which is not beyond sound aeronautical engineering, can be provided.

An airplane from now on can be, and I believe will be, required to possess maximum attainable efficiency for its job. And further, two items which have in the past been not too carefully considered will be of importance. Second is a need that ruggedness be attained even at the expense of structural weight.

Development of better airplanes cannot look to improved fundamental aerodynamic design in the immediate future. Production is now at the heels of research, which normally should be two or three years in advance. That is, the newest and best of airfoil designs is quite commonly used in current production.

Supplemental devices for aerodynamic improvement, slots, flaps and other such devices have their place and will be used. I believe, however, that their place is more definitely in the classes of equipment that are elemental, i.e., for training and building up experience. Beyond that, their place is not established in the practical minds of operators or pilots.

Wing loading has probably reached its peak, and the tendency will be to fall off in this respect. Airplanes must operate from fields as they are, and not from the fields we like to visualize. Established airports within reasonable proximity to large centers of population, particularly in the East, are not available in the expansive areas we hear so frequently recommended. Airports of more limited dimensions, but still logical and usable, are beginning to be available, and the airplane must adapt itself to this condition rather than follow the tendency of the past to suggest altering geography. Therefore, low wing loading, with attendant shorter take-off and quicker climb, which I consider of more importance than short landing, must be contemplated.

Aspect ratio, previously considered a very definite advantage, is no longer attractive. Some airplanes with very low aspect ratio have proved efficient in the air, and there can be no argument that more compact dimensions, particularly in regard to span, are of very great importance in ground handling and storage.

Perhaps the greatest field for development is dependent upon the perfection of materials which are particularly adaptable to aviation uses. Metal construction is most attractive from the point of view that it appears to be already demonstrated that all-metal airplanes can be built in which maintenance and depreciation have been reduced

to a minimum figure, but the metals are not entirely satisfactory. Their greatest value appears to be largely on paper from their low weight for strength ratio. Unfortunately, however, the strength factor depreciates rapidly due to corrosion and general fragility. I regretfully feel that wood wing spars and fabric wing covering are not to be replaced in the near future.

Altogether, in summarizing, it seems that the development of equipment during the year 1930, and very possibly extending further into the future, will be accomplished by taking very careful stock of the available features of design, presenting them in the most favorable combinations and thereby providing airplanes for individual projects which are to the highest possible degree useful.

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Giant Airplanes—Go Slow on Abandoning Wood

By FRANK M. SMITH
Vice-president, Moth Aircraft Corp

I BELIEVE THAT the general trend of design will be toward the low-wing monoplane, as it is planes of this type which most designers feel have the greatest future.

2. I believe that there will be some very interesting developments in the line of large planes in the near future. Such planes will be built and have greater power and far better accommodations for passengers. I have in mind a design which I have recently seen completed by a nationally known designer which is even equipped with brass beds, sun parlor and smoking room. This plane is designed to carry 45 passengers.

3. There will without doubt be a large amount of development along lines of slotted wings and safety devices as a result of the Tanager success in the Guggenheim competition. Already many designs are under way embodying a great many of the features used on the Tanager.

4. The controversy between the cantilever and externally braced wing truss exponents is due to continue for some time, but I believe that the cantilever wing will be the wing of the future, brought about by use of material with higher strength factors than is now obtainable.

5. I believe that the trend toward the rise in the unit wing loading has about reached its limit and that there will be little advance in this feature in the future.

6. I believe that aspect ratios are likely to remain approximately constant on the average. There are, however, some designers who are working toward an increase in aspect ratios at the present time.

7. Undoubtedly there will be further progress along the line of elimination of wood in airplane structure. It is questionable, however, if such a policy is sound at the present time as regards expense in manufacture.

It is surprising but no less true that although a wooden plane was the first we constructed, economical use of wood in airplane manufacture is to be found in practically all of the factories in the United States. There is no question but that at the present time proper investigation into the purchase and use of wood will result in the manufacture of wings at a price which cannot be approached in the metal construction at its present state of development.

8. I believe that the use of duralumin in construction will be replaced in the next two or three years by the use of new alloy steel metal now coming on the market.

9. I believe that the introduction of the Musselman air wheel will have great effect on landing gear design and that all planes in the near future will be equipped with brakes, and steerable tail wheels.

The tendency to nose over is largely overcome by the use of the air wheel, and its landings can be made on soft ground without danger.

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Better Landing Gears and Multi-Engined Planes

By JOSEPH KREUTZER
Chairman of Board, Joseph Kreutzer Corporation

I DO NOT THINK any noticeable change will be made in structural or aerodynamic design, but more attention will be given to cleanness of details.

2. There is probably no change to be expected in large planes for the present year due to uncertain conditions of the industry. Volume of air traffic will be the large governing factor in regard to size of planes.

3. I believe manufacturers will stick to standard design, although extensive experimental progress will go on in all branches.

4. Cantilever braced wing construction will predominate for reasons such as cost in production and replacement. Metal construction will favor cantilever methods.

5. Wing loading will remain practically constant for the time being.

6. Aspect ratio should remain practically constant.

7. Metal construction will increase gradually, particularly during the present year.

8. Duralumin structures will continue to predominate.

9. Shock absorber travel will increase for softer landing. Landing gears will undoubtedly have wider tread due to enormous advantages gained. Modification will be required on light plane brakes to prevent nosing over.

10. I believe trend will be more toward multi-motored planes due to higher factor of safety—ranging from 4-place jobs upwards.

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Higher Cruising Speeds Without Increase of Landing Speed

By FELIX W. PAWLOWSKI
Guggenheim Professor of Aeronautical Engineering, University of Michigan

I WISH TO ADMIT that I have certain more or less definite points of view upon the various questions presented. However, I am not quite sure that I shall be able to answer them specifically as to the time limit (1930-1931), since some of the developments may take a whole series of years for realization, and it is impossible to foresee what part of the developments will be accomplished within the year 1930. It is also difficult to separate in one's mind the things that one would like to see accomplished from the things that can be accomplished under circumstances governing the develoment of a new art and industry in a country.

1. This question is very intimately connected with another question, in my opinion perhaps the most vital question in connection with the future of commercial flying in this country, namely, the question of increase of cruising speeds without increasing the landing speed

Present cruising speeds (around 90 m.p.h.) are certainly too small. At these speeds the time saving element is very small in comparison with what railroads and automobiles can offer, and the situation is still further aggravated by excessive distances or poor transportation between airports and business centers of many cities.

This situation is not so acute in Europe, due to the much lower rates per mile (which, of course, are possible there, thanks to the government subsidies) [the relative condition has been changed, since Professor Pawlowski's statement, by the sharp reduction of rates on most American lines.—Ed.]; besides, the European airplanes have, as a rule, somewhat higher cruising speeds. [American operators will strongly question this.—Ed.] If the American public could be offered cruising speeds of 150 m.p.h. or better, it would undoubtedly increase greatly the patronage of our air lines. It seems to me, that without an energetic and successful effort on the part of our airplane manufacturers in that direction, the aeronautical industries will suffer, soon, a severe setback, which may impair the future of aerial transportation.

It would not do to increase the cruising speeds by increasing the wing loading and the power loading of airplanes, as this would result in a parallel increase of landing speeds. While landing, even at 100 m.p.h. and higher, might be perfectly safe on good airports, we have to count with emergency landings on terrains at which such landing speeds are prohibitive.

It is, however, possible to increase the cruising speeds without increasing the landing speeds, although it is a rather difficult problem, requiring numerous trials and careful and delicate adjustment of the various *aerodynamic elements* in the design. A good example of the possibility of this are the French pursuit planes with top level speeds of about 200 m.p.h. and landing speeds of 50 m.p.h., thus having speed ratios of 4 : 1 in monoplanes and biplanes as well, and this, without any artifices such as slots, flaps, variable cambers or wing areas, or retractible landing gear. The speed ratios, with perhaps one exception, are only between 2 : 1 and 2½ : 1 in our commercial planes.

2. At the present stage of development of air travel, I do not see any immediate necessity for larger planes, i.e., planes carrying 20, 30 or 100 and more passengers. As I understand, in Europe airplanes are flown on the average, with one-third of the passenger load for which they are built. While the problem of design and construction of huge airplanes is most fascinating for the aeronautical engineer, the ever careful manufacturer will very likely abstain from producing such airplanes, being satisfied with the present market for cabin-planes of 5-, 10-, 15-passenger capacity.

3. Striking departures from accepted form, such as the slotted wing will very likely not appear on commercial airplanes in the immediate future. The slotted wing certainly promises very interesting possibilities. However, the whole question of slotting the wings is still very little known; for instance, there seem to be possibilities for slotting the wing in several different ways for different effects or purposes, and this problem may branch out into that of removal of the boundary layer. But while all these problems will furnish plenty of food for activities in aeronautic laboratories, they will not soon furnish sufficiently reliable results for the designer to base his commercial work upon.

It seems to me, however, that the rather crude solution of variable camber by means of flaps (rear, or front and rear) offers considerable aerodynamic advantages in spite of structural complications, and since the experimental study of an individual case does not go much beyond the routine wind tunnel test in order to secure the necessary design data, I therefore expect airplanes of such a type to appear in the near future.

The same thing may be said in favor of retractible landing gear, particularly in connection with low-wing airplanes which lend themselves to this improvement without undue mechanical complications and increase of weight.

I venture to suggest, if not to predict, the appearance also, of the "flying wing" type airplane; not the huge one as dreamed of by Professor Junkers, since the time for it is not quite ripe, but the small and middle size commercial "flying wing" which equally well offers considerable aerodynamic and, what is more important, structural advantages and economy of operation.

4. This question is most intimately connected with that of size or load capacity. It looks as if the limit of size in pure cantilever and in semi-cantilever has been reached already (considering the strength and lightness of the present materials) in the last huge Junkers landmachine and Dornier's DO.X seaplane respectively, although the latter could be more properly termed a sesquiplane. Since I do not see any necessity for commercial airplanes of such sizes, therefore the pure cantilever type for smaller, and the semi-cantilever for middle size planes, both offering well-known aerodynamic advantages against the orthodox biplane, should and will be favored by designers and manufacturers. It should be kept in mind, also, that it is easier to design an efficient monoplane than a biplane for these moderate load capacities. Personally, I do believe, however, that it is possible to build biplanes and sesquiplanes as efficient as monoplanes, but this will become a necessity only when we are in position to build huge planes carrying hundreds of passengers, something that belongs to a somewhat more distant future than 1930.

5. This question is very closely connected with that of increase of cruising speed, discussed under question 1. Since higher cruising speeds are of utmost importance for the welfare of commercial aviation, progress in this direction will unavoidably result in increase of wing loading. The successful solution of this problem will be facilitated by the to-be-expected increase of reliability of engines. The well established aircraft Otto-cycle engine industry will fight hard for existence in the face of a new "menace" in shape of the Diesel-cycle-engine; besides, the Diesel-aircraft engine is too new to compete in reliability with the gasoline engine, so that the latter has still before it a good many years in which to reap its harvest. The designers and manufacturers of the present engines will put all of their accumulated experience, skill and energy behind their product and, therefore, we may expect in the near future a marked increase in the life and reliability of the gasoline engine, parallel with which will go increase of cruising speeds, increase of wing loading, elimination of emergency landings, and simplification of landing gear.

6. The aerodynamic advantages and the structural disadvantages and cost of high aspect ratios are by now well established, and known to designers and manufacturers. The present popular values of aspect ratio, being the result of compromises based on experience, will not likely be subjected to changes in the near future, and will remain within the present limits, which are sufficiently wide for design of reasonably economical planes.

7. In spite of all the advantages of metal planes above those made of wood primarily, metal is far from the ideal material for airplanes, and wood construction is not deprived of all its merits. For example, as I understand, in European commercial flying, the service life of a metal plane is accepted at five years and that of a wooden one at three years, while the cost of a metal plane is about twice the cost of an equivalent wood construction. The operator can therefore derive more service at the same money outlay from two wood planes than from a metal plane, and so the wood plane will continue in existence for some years to come.

8. Some very interesting applications of steel strip construction have been developed in France and particularly in England. We have also very notable examples of skilful use of steel tubes in wing spars in this country. I would not be in the least surprised to see an increase in use of steel for wing construction in the near future, although this might depend also to a considerable degree upon the policies of our duralumin producers.

9. The successful development of the Musselman type of tire, and experience in the use of it, may result in checking the necessity of larger travel of the usual shock-absorbing devices. In general, the whole question of landing gear design has very much to do with the merits of our landing fields and with the necessity of allowing for emergency landings on not quite suitable terrains. The changes in landing gear design will, therefore, have to go parallel with the improvement of landing gears and with the progress in reliability of the engines.

PROMINENT aircraft engine designers were asked substantially the following questions:

1. Is the liquid-cooled engine likely to regain substantial favor during the coming year?

2. Will air-cooled engines continue to be predominantly radial in form?

3. What are the most important improvements in engine performance to be anticipated in the near future?

4. Do you think that it will be possible to make further increases in compression ratio without change of basic fuel?

5. Are you in favor of a marked improvement in standard fuel as governed by specifications?

6. What is your opinion of the probable early future of the compression-ignition type in aircraft engines?

7. Do you look forward to marked innovations in cylinder arrangements?

8. What is the prospect for the use of materials outside the ordinary present range of commercial practice such as magnesium, and of new manufacturing processes such as the forging of cylinder heads of duralumin?

9. Are you satisfied with the present type of engine mounting and the ways in which it is applied?

10. Are any marked improvements in accessory installation and in "plumbing" to be looked for?

11. Will there be a trend towards the building of unit power plant sections, with the engine designer providing for standard mountings, cowlings and accessory locations?

Radials, Air-Cooled, for Dependability—Controllable-Pitch Propellers—Magnesium Soon

By E. E. WILSON

President, Hamilton Standard Propeller Corp.

IN MY OPINION, the liquid-cooled engine is not likely to regain substantial favor during the coming year. I believe the general trend will continue towards air-cooling. While chemical cooling appears to offer certain improvements over water cooling, nevertheless, any indirect cooling process must be inferior to the direct cooling process from the point of view of dependability. As time goes on, we begin to appreciate more and more the importance of dependability. The whole progress in air transport is almost directly dependent upon this factor. People will begin to fly when experience has demonstrated conclusively that air transport is as dependable as any other form. Certain transport companies have demonstrated that it can be made more dependable. In my opinion, we can afford to sacrifice a good deal more weight, first cost, economy of operation and durability, to absolute dependability.

In my opinion, air-cooled engines will continue predominantly radial. I do not anticipate a trend towards the development of in-line, V or X form engines. In most of the modern engines, low cost, light weight, ease of maintenance, durability and dependability are directly due to the single-row radial form. The only advantage to be had in another form of engine is the possible advantage of improved vision. In my opinion, the price paid for this improvement is too great, as it involves departure from the single-row radial form.

The most important improvements in engine performance to be anticipated, should result from the use of higher compression ratios, supercharging, controllable pitch propellers and reduction gearing. All of these are more or less linked up with improvements in propeller design. There is a large field open for improvement here. Lighter propellers must be obtained to permit the use of reduction gears. Controllable pitch propellers must be had to permit the use of supercharging and over compression, and the improvement of performance which will result from their use. I believe substantial

reduction in weight can be had in the power plant as a whole, without any loss of dependability or durability.

Further improvement in power plant performance can be had through improvement in fuel. The chief opportunity here lies in the development of anti-detonating fuels. Perhaps along this line may be found the simplest, easiest and cheapest means of increased power out-put. The variation in anti knock characteristics of available fuels is surprising. The influence of fuels on dependability is striking. It is hard to compare fuels from this point of view, without elaborate apparatus. It is impracticable to write into the specifications a test for anti-detonating qualities. Nevertheless, this somewhat intangible factor is one of the greatest single items in operation. No operator can afford to use any but the finest anti-knock fuel. There is much room for improvement here.

In my opinion the compression-ignition type of engine has sufficient advantages from the point of view of reduction in fire hazard alone to warrant active development. Whether heavy fuel is burned by some new process, or is adapted to old forms of mechanism, remains to be seen.

There appears to me to be a possibility of great improvement through the use of new materials. A great deal is being learned about magnesium. The general employment of this material in aircraft appears to me to be not very far away. Magnesium has been feared from the point of view of corrosion. It is very interesting, therefore, to learn that the protection of magnesium has advanced to the point where this material is now being used in commercial chemical plants where no other material will withstand the corrosive agents encountered.

The present relation between the responsibility of the airplane, the engine and the propeller designer leaves a good deal to be desired. I believe, however, that progress lies in closer co-operation rather than through the attempt of any one of the branches to take over responsibility for all.

In general, it appears to me that there is room for, and hope for, even more striking advancements in the year to come, than those recorded in the year just closed.

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Ascendency of the Air-Cooled Radial—Diesels in Largest Sizes—Higher R.p.m.

By LOUIS J. MERRILL

Chief Engineer, Axelson Aircraft Engine Co.

As regards the trends of the aircraft engine industry in the year to come, we can base our predictions only on the developments which have come to light in the immediate past, and on such developments as our limited scope embraces at the present.

Among the notable developments in the past year was the decrease in frontal resistance brought about by the introduction of high temperature cooling liquids. It has been rumored that several experimental projects are under way, which contemplate the use of high temperature cooling liquids both with the conventional liquid cooling arrangement of jackets, radiators and circulating pumps, and a new comer to the field which will dissipate the heat from the cylinders through the cooling medium and directly from the fluid to the air by means of a finned jacket. It is the writer's opinion that although both types present numerous advantages over the water or low temperature liquid cooling, yet they present certain very definite disadvantages, which can only be eliminated by direct air cooling.

Without going into detail the main disadvantage seems to be increased weight per horsepower, increased cost and complication, together with added possibilities of failure in the case of the types which still employ circulating pumps, possibilities of engine failure and subsequent forced landing due to excessive leakage either externally or, through cylinder head joints, internally. Proponents of liquid cooling and also of the in-line type of air-cooled engine continue to stress the fact, or what they consider to be the fact, that an in-line engine reduces the frontal area and increases visibility. Although we cannot doubt that freedom of vision is increased with certain types of in-line engines, yet we must take radical issue with anyone who claims that the resultant drag produced by the necessity of passing air over the cylinder is less in the in-line type than in the radial of the same horsepower.

In order to thoroughly understand the argument pro and con it is necessary to get down to a few simple fundamentals. Briefly, why is it necessary to cool an internal combustion engine? The answer is simply that the mean gas temperature within the cylinder and combustion chamber is higher than the critical temperature or the temperature at which known engineering materials lose the greater part of their strength.

In order, therefore, to reduce and maintain temperatures of cylinder and head below this critical temperature, it is necessary to bring about a temperature differential. In other words the outer surface of the metal must be exposed to a medium whose temperature is maintained far enough below the mean gas temperatures in contact with the inner surface so that the average temperature may fall below the critical temperature of the metal.

Thus, we have four factors determining the temperature of the cylinder and head metal. They are the mean gas temperature within the cylinder and the area of heating surface, and on the outside the area of cooling surface and the mean temperature of the fluid, whether it be liquid or gaseous, which is circulated over the cooling surface. Of course, there are other factors influencing the exact temperatures, such as the coefficients of heat conductivity within the fluids and the walls, as well as the coefficient of heat transfer from one to the other, but assuming that these items are relatively constant in both air- and liquid-cooled engines, we may eliminate them so that our discussion may not become too intricate. We may then say that the amount of heat available is determined by the piston displacement or horsepower of the engine under consideration. The heating surface is dependent on the bore stroke ratio and the combustion chamber design, but for purposes of comparison we may assume similar internal design.

With parallel amounts of heat available and heating surface, in order to maintain parallel metal temperatures we must provide parallel amounts of cooling air regardless of whether the heat passes directly from the metal to the air through cooling fins, or, whether it goes from the metal to a fluid and thence to the air, either through a cooling radiator or a finned jacket.

To the student of aerodynamics it becomes immediately obvious that the same volume of air at the same temperatures and velocities must be passed over the cooling area in order to maintain reasonable cylinder

wall and head temperatures regardless of the method of getting the heat from the heating surface to the air. This means that in two engines with the same horsepower the one with radial air-cooled, the other with in-line cylinders, either air or liquid-cooled, the same relative amount of air must be disturbed in order to provide the ultimate cooling fluid. In my opinion this gives the advantage of reduced drag to neither type but fairly and squarely divides the actual drag chargeable to cooling.

It is the personal opinion of the writer that the popularity of the radial versus the in-line V or X will be determined by considerations other than those mentioned above.

There is at the present time a rather definitely marked maximum size to which air cooled internal combustion cylinders may be built. This is probably due to the fact that the heat available is in direct proportion to the volume, and the volume increases as the cube of its mean dimensions whereas the area of the surface enclosing that volume increases only as the square of the mean dimension. This presents overheating problems which undoubtedly will be overcome eventually but are definitely limiting cylinder sizes at the present time.

It is also to be noted that demands for higher horsepower are rapidly increasing. This, due to the limitations of cylinder size, indicates the necessity of a greater number of cylinders per unit. It has been proven that nine is the maximum number of cylinders practical to group radially in a single bank, so that in order to increase radial engine capacities having reached the maximum of nine cylinders, there remain only two alternatives. The first is to develop larger cylinders and the second, to resort to the multi-bank radial. There are several instances of successful double bank radial engines, but as far as we know there are no successful radial engines in existence today of more than two banks. This limitation may force engine designers to resort to in-line multi-bank engine, however, we feel it highly improbable that engines of this size will appear in the immediate future.

From the present outlook it would seem far more practical to devote research on designs above 500 hp. to the Diesel type. It would seem from our limited experience that the Diesel due to the difficulty of metering sufficiently small quantities of fuel in the smaller sizes, would naturally confine its successful development to the larger types.

The most important development which we anticipate in the near future is the introduction of either new propeller designs and higher shaft speeds or a controllable pitch propeller, which will allow engine manufacturers to take advantage of higher engine speeds in order to reduce the unit engine weight. Although it is hardly consistent to speak of higher speeds and at the same time talk about greater reliability and increased life between overhauls, yet it is considered possible that by careful design and selection of materials lighter reciprocating parts may be developed which will produce about the same unit bearing loading. Considering the general picture this should mean lower weight power plants for the same power output or greater power output for the same weight.

In the former case a reduction in over-all weight would mean less time at full throttle for the same ship performance, and in the second case a greater power per unit weight would mean either less time in covering a fixed distance or lower cruising r.p.m. to cover the same distance in the same time. All of which should mean increased life.

Regarding the possibility of increasing compression ratios, our attention is at the present time focused on two interesting induction systems: the down draft, and the more recent dual manifolding which separates the main intake air from the mixture recently introduced by Karl Kindl of the Delco Laboratories. Both systems tend to lower induction temperatures, which in general indicates lower mean gas temperatures within the combustion space and should allow higher compression ratios without detonation.

It is the writer's opinion, however, that aside from manifolding, definitely higher compression ratios together with higher brake mean effective pressures and a general improvement in over-all performance may be realized when fuel specifications become more definitely standardized and fuel of this standard specification becomes more generally available.

With regard to the possibilities of the use of the recently developed light alloys, particularly magnesium alloys, we believe it is very reasonable to expect a large number of manufacturers to standardize on the use of magnesium alloys for crankcases, accessory housings and all such engine parts which are not directly subjected to extremely high heat loads. It is our understanding that magnesium has a higher coefficient of expansion and a decidedly lower coefficient in thermal conductivity, which would preclude its use in either cylinder heads or pistons except in engines of very small sizes where the unit heat loading would be relatively low.

It is our opinion that the copper aluminum alloys similar to Bohnalite J or the 122 specifications of the Aluminum Company show definite advantages in the way of better hardness and heat conductivity and will, therefore, be much more prevalently used in cylinder head and piston. Forged duralumin will find increasing use in crankcases and possibly in piston work, but it is somewhat doubtful what processes will be arrived at in the near future which will permit of forging the fins of a cylinder head although this is not at all to be considered as impossible.

As regards engine mounting, it is hoped that in the not too distant future the engine manufacturer may be able to design, build and deliver a power unit to the airplane manufacturer, this unit to consist of the engine proper and exhaust collector, complete engine cowling, at least as far back as the normal engine mounting ring, and the engine mount as far back as the point as which it is normally attached to the four longerons of the fuselage. The continuance of an exhaust pipe should be determined by whether or not the ship is a cabin plane requiring heaters and should be left to the ship designer, and the continuance of the cowling between the normal engine mounting face and the point at which the engine mount joins the fuselage proper would normally be determined by the remaining contour of the ship, and also should be left to the ship designer; but the controls including spark, throttle, tachometer drive, thermometer, oil pressure gage ignition switch, fuel lines, cylinder head, thermo couples, etc., could be very easily arranged to be brought back to the rear bulk head of the complete unit. The unit should also include such oil tankage and plumbing as is necessary and have a standardized fire wall. This would immediately place an added burden on the engine manufacturer, but due to standardization and subsequent increased production should decrease the over all cost of the ship and generally assist the industry.

Sea-Level Supercharging—Better Reliability—Unified Responsibility for Installation

By LIEUT. COMDR. J. M. SHOEMAKER, U.S.N.
Bureau of Aeronautics, Navy Department

THE IMMEDIATE FUTURE holds for airplane designers a wide choice of engine types, each type offering definite advantages for a specific type of airplane. The fundamental requirements of an airplane engine will still maintain. Dependability is of paramount importance, but the other fundamental requirements must be weighed for each particular case.


J. M. Shoemaker

Liquid cooled powerplants offer less drag and lower specific fuel consumption than air-cooled powerplants, but are heavier and more expensive. In small airplanes, where powerplant weight and powerplant cost are a large percentage of those of the complete airplane, the advantage would seem to be with the air-cooled engine. In large planes, powerplant weight and cost become a smaller percentage of the totals, and it becomes a question of whether or not the minimum powerplant drag and lower fuel consumption of the liquid-cooled powerplant more than offset the higher weight and cost. In this connection, the powerplant drag can have such an effect on thrust horsepower required, that a low-drag powerplant can be lower powered for the same airplane performance than can a high-drag powerplant.

In the air-cooled engine field, in-line and inverted Vee engines are available. They offer marked improvement (in fuselage installations) in forward vision and perhaps some decrease in powerplant drag over radial engines. But in fuselage installations the radial engine permits a concentration of powerplant weight as close as possible to the airplane center of gravity, which is a distinct advantage. In nacelle installations this advantage disappears, but so does the in-line and Vee advantage of forward vision past the engine.

Aircraft engines can be expected to make more extensive use of supercharging as a means of improving engine and airplane performance. The non-availability of a good controllable pitch propeller is the one thing that prevents extensive application of superchargers today. Superchargers for boosting of engine power at sea level will probably be more widely used, as this means of increasing cylinder pressures is less conducive to detonation than is increase in compression ratio. Substantial reductions in the specific weight of four-cycle engines do not seem immediately probable. It is more likely that maintenance of present engine weights, coupled with improvement in materials and refinement of design, will increase reliability and durability.

The Bureau of Aeronautics has been fostering a policy of gradual improvement in aviation gasoline. Gasoline in 1930 will be far superior to that of former years as regards anti-knock characteristics and will have country-wide availability as well as reasonable price.

The early use of compression-ignition engines should properly lie in the field of high-powered powerplant units in airships and large airplanes, where long flights will permit full advantage to be taken of the improvement in fuel economy, and where the power plant weight will be a small part of the total aircraft structure.

Airplane engine accessories such as pumps, magnetos, spark plugs and carburetors are constantly improving. In addition, new entrants in the engine accessory field are being encouraged in the hope that there will be competition throughout the field. The past has seen the accessory field dominated by a handful of dependable products, with the result that prices have been out of sight. This has been a source of constant irritation to engine manufacturers, especially in the field of small engines in which the high-priced accessories have raised engine costs enormously.

Airplane engine manufacturers are falling in line with the idea that they should supply their engines complete with exhaust collectors and cowling, and the large companies go farther than this in the employment of installation engineers who check engine installations from both a powerplant and an aerodynamic viewpoint. The "ultima Thule" in this direction is the sale of engines on a Thrust Horsepower basis. This involves the design and supply of reduction gears and propellers, with gear ratios and propellers designer for specific installations.

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Closer Government Regulation—Work Toward Standardized Installation Details

By GLENN D. ANGLE
Vice-president, LeBlond Aircraft Engine Corp.

THESE EXPRESSIONS from engineers intimately connected with the design and development of aircraft engines seem rather well timed, as there is evidence of considerable diversity of opinion throughout the industry regarding the types best suited to the probable trend of future development. It is unlikely, nor can it be expected, that all these opinions will be in agreement except perhaps on a few points. Every engineer views the situation in more or less the light of his own developments. When a majority agree, however, the idea cannot be far from right, and it is hoped that airplane manufacturers will digest these opinions and derive some benefit therefrom.

I believe that aircraft engines up to 200 or possibly 300 hp. will continue to be predominantly of the air-cooled radial types. Although this type apparently excels at the present moment in the higher power ranges, I would hesitate to predict that it will maintain this position for an indefinite period in view of other developments which show promise, even though their justification has yet to be proved. I refer particularly to the liquid-cooled types, either liquid or air-cooled Diesel types, and air-cooled engines with in-line, Vee or other forms of cylinder arrangement.

It would be altogether too presumptuous on my part to express detailed opinions on the possibilities of any of the above at this moment. Liquid cooling mediums other than water have been known for quite a time, and the sudden publicity and enthusiasm so noticeable at present seems a bit over-done. There is no question that in certain types of engines these developments are justified, but it will be some time before this manner of cooling will become generally adopted as there are many problems to be solved.

We have listened to numerous discussions in regard to the use of compression-ignition engines employing heavier and cheaper fuels, and to date enough work has been done to demonstrate some of the possibilities as well as to prove that the variety of problems associated with these developments are by no means simple ones. Great credit will be due any engineer or organization developing and producing commercially a successful engine in this category within the next five-year period. It is believed that the fullest advantage of the possibilities in this type can be attained only in large units designed primarily for lighter-than-air installations, and there is little, if any, hope of this type replacing the conventional engine for the heavier-than-air type of craft requiring outputs under 500 hp.

The in-line, Vee, and other arrangements of cylinders in air-cooled engines have so few points in their favor when compared to the radial forms that there is no necessity of launching a detailed discussion. There are many who attach great hopes to the possibilities of air-cooling in types requiring the general direction of the cooling air blast to be diverted. Some engines of this class may be developed to a fairly successful degree, but it is not expected that the popularity of the radial type will be seriously threatened in any power class.

I look forward to marked improvements in the design and construction of air-cooled radial engines during the next year or so. The manufacturers of this type who have satisfactorily passed the preliminary stages of development and manufacturing can now devote their energies to the more detailed refinements of their product. This will assert itself in greater reliability, longer life, lighter weight, and possibly lower costs.

I anticipate greater use of magnesium, and although castings of this material are more expensive at the present time, there is promise of a sufficient reduction in cost to place them on a par with aluminum when larger demands are created. There are numerous other improvements in design, as well as developments of similar character, which further research and test will soon place in general use. Developments of this nature, rather than new and untried types, will give the aircraft engine industry the desired stabilizing effects.

The trend toward higher engine speeds will continue, and along with this will be the further development of propeller reduction gears. This is in keeping with efforts to reduce the overall diameter of the radial engine, which seems to be the only serious objection raised against it, whether real or imaginary. Moreover, increased output without a proportional increase in overall diameter is possible in the two-row type, and we may expect further developments along this line.

In addition to refinements in the engine, designers must give serious attention to the problems of installation. There has always been a noticeable lack of co-operation between the engine and plane manufacturer in matters of this kind. No doubt in due course there will be standards adopted for mountings, cowlings and the like, but first the airplane designers must arrive at a more common understanding regarding their requirements. When standardization is found to be practicable without working unnecessary hardships on the airplane designer, the engine manufacturer can and should furnish, or in any event approve, all units of the installation which might affect the performance of the engine.

At the present time there are a few distinct types of construction in air-cooled radial engines, and the majority of recent designs are merely copies. It is usually conceded that a copy is never as good as the original. There should be some means of protection against pirating of this sort which would obtain quicker action than patent litigation in the courts. Perhaps an association of leading manufacturers would serve such a purpose.

The Department of Commerce tests for approved type certificates have protected the public to a large extent against unsafe engines. However, the regulations governing these tests have been revised occasionally to meet contingencies and not all the type certificates have been issued on a like basis. Too much regulation, as everyone knows, is extremely dangerous, but it does seem necessary for this department to function more rigidly in certain respects for the protection of conscientious manufacturers. It is deceiving and confusing for manufacturers to advertise the output of their engines greater than their approved rating. This should not be permitted, and if the manufacturer is not satisfied with the rating given the engine, he should be compelled to submit to another test if he wishes to sell his product at a higher rating.

Furthermore, as soon as the time and facilities will permit, it should become a duty of the Department of Commerce to run annually a test an any engine which one of their representatives may select from regular production. Control beyond the point of determining if the manufacturer is maintaining proper workmanship and material specifications should not be permitted. Suggestions relating to design changes seem to be entirely out of order unless the test shows a change is necessary, and then this should be the problem of the manufacturer before being granted an approval.

Authority to regulate should extend beyond the block tests because of installations that do not provide conditions for which the engine is suited. I refer particularly to tests conducted on in-line air-cooled engines which require special air scoops and cowlings when installed in a ship. It should be necessary to obtain cylinder temperature readings on all cylinders in flight, and these should not exceed a certain amount under given conditions, nor vary more than some prescribed figure. The same treatment should apply to radial air-cooled engines as well, the idea being primarily to provide safety for conditions under which the engine is actually being used. It is believed that greater uniformity of regulation on the order of the above remarks will go far toward stabilizing the industry, and in reality will benefit the manufacturers of aircraft engines rather than restrict their activities as one might at first suppose.

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Refinements and More Speed—Commercial Considerations Control Design

By GARLAND P. PEED, Jr.
Chief Test Pilot and Consulting Engineer, Alexander Aircraft Co.

THE GREATEST PROGRESS during 1930, in my opinion, will be in the line of refinement of existing models, with some "freak" showings. Cleaning up of detail will occupy the greater number of manufacturers, with more stress on interiors and colors. Aerodynamic efficiency will increase with cleaner structures, better lines and more attention to streamlining of details. The structural details will be largely similar to the present, with more of the light alloys being used.

With the solution of the flat spin will come a much larger use of "low wing" monoplanes of cantilever structure, especially in the "private owner" class of planes

I doubt if there will be very many extremely large planes built during the year, other than to consolidate and cover the ground already at hand. The 32- to 40-place ship will be built as standard for the air lines and work will start on ships to carry 80 to 100 though it is doubtful if any will be built before 1931 The Dornier Do X will remain about the largest plane built for production. There may be one or more planes built larger than this as experimental, but hardly for production. The use of slots flaps, etc., will not increase to any great extent. It always takes two to five years for any novelty to be accepted, and in the case of the slot increased stability designed into the plane will more than cover the advantagrs attained by its use. There possibly will be planes equipped with flaps in production before the end of the year, more as experiments than otherwise There will be many more cantilever wings produced, with the small sport and private owner planes using this type very extensively Wing loading is likely to go higher, especially in ships equipped with flaps or similar novelties Owing to the larger moments and stresses set up, aspect ratios are not likely to take any sudden jump but will increase slowly in new types shown for the first time. The largr aspect ratio is conducive to flat spinning and is likely to be avoided for that reason

Construction materials will remain substantially as at present in existing types New showings will run more toward the use of light alloys The use of alloy steel strip will be experimented with, though for the present metal spars are more likely to be made of tubing Spars of molybdenum tubing with duralumin ribs will be more the trend of design. Generally safer landing gears will be seen, but travel and treads will remain approximately constant. The retractable landing gear will appear on at least one low-wing cabin type The use of air wheels without shock absorbers will come more and more into prominence, especially on the smaller planes, with landing gears shifted forward slightly

Outside of the new experimental types the year will be spent refining the existing planes All manufacturers will be experimenting with faster more advanced types and next winter should see the retooling of a great number of factories to produce very advanced aircraft. However, the existing large stocks of tubing and wood will be used up before these types are produced commercially and the newer types are very likely to suffer from "stock on hand" for some time to come

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New Cylinder Arrangements—Self-Contained Power Plants

By O. E. SZEKELY

President, Szekely Aircraft & Engine Co

JUST AS SOON as a liquid-cooled engine is designed with weight comparable to the air-cooled engine, and just as soon as an air-cooled engine is so designed as to eliminate any necessity for a radiator or other liquid cooling accessories, and just as soon as a liquid-cooled engine employs a cooling medium that does not freeze in cold weather or boil in the summertime, its place in the aircraft industry will be definitely established, and such a design might be looked for this year.

2 Until such time as V or X type engines produce greater efficiency than the present day radial engines, and until the V and X type engines permit a so-to-speak short-nosed ship to be built, bringing the center of gravity farther back than where it is now, the radial air-cooled type engine will be predominantly and decidedly the power plant

However even radial type air-cooled engines need a design change comparable with that of the development experienced in the design of the automotive type of engine now so successfully produced in quantities

3 Very important improvements are to be looked for this year I hardly believe that the development of horsepower can be very greatly increased, but I do believe that the reliability and the life of engines will be multiplied a good many times over the present

The substantial reduction in weight per horsepower goes hand-in-hand with the increase of horsepower of the present type, as I have indicated above, and reflects entirely upon the steadiness and durability of the engine Therefore, I judge that the trend will bring us to an increase in the reliability and durability of engines rather than increasing horsepower for a given weight, or maintaining horsepower, and reducing the weight

4 The compression ratios in the past many years of experience of the automotive industry do not show such changes as the aircraft engine industry is willing to play with, and frankly I am assuming that if no definitely advantageous results have been obtained so far by very noted designers of automotive type of engines using present fuel, I hardly believe that compression ratios will change in aircraft engines

5 I am in favor of improvement in fuels in every respect, but I doubt, again until further and very definite developments along these lines, the feasibility of great increases in compression ratios Brake mean effective pressures may be enhanced by other means also without necessitating decrease in weight Decreases in frontal area will be very desirable

6 I shall look forward to great developments in the compression-ignition type of engines, but I still feel its first crucial test is to be in machines on the ground before extensive experimentation in the air

7 Yes, I look forward to changes in cylinder arrangements because most of us have found out that practically every type built today is a modification of some original design some years ago, but I hardly believe any of them are much improved over the old type radial engine in principle, although somewhat improved in mechanical construction

8 Everything points to such developments as are indicated in the queston

9 No

10 Untold improvements are to be had and will be in the accessory installation and certainly in the so-called plumbing The "self-contained" engine is to be looked for and hoped for. I mean by this that all drives and all connections, except gasoline, shall be inherently part of the engine, and that even the present day radial engine will have its own oil container of some kind which will be an integral part of the engine itself. This is also true for the liquid-cooling medium

11 Standardization for the purpose of standard mountings, accessory drives and connections, the proportionate standardization of weight, the standardization of instruments used in connection with the engines and their drives is the only real answer to the responsibility of the engine designers

GENERAL NEWS

HERBERT F. POWELL, *News Editor*

HIGH POINTS in the NEWS

▶ *Insurance figures* Guggenheim Fund reports on the results of an insurance survey it conducted. Finds 109 firms write aero policies Believes insurance firms should gather facts and distribute them at a central agency

▶ *Sergievsky succeeds* An altitude of 19,500 ft in a Sikorsky S-38, with a 2,000 kg load, and a speed of 132 5 m.p.h. over a 100 km course with the same load and craft, were reached by Boris Sergievsky chief test pilot for Sikorsky The former mark establishes a new world's record the latter a new American attainment

▶ *Massachusetts and air rights* The Supreme Court of that state hands down a decision stating that planes flying at an altitude of 100 ft or less over private property constitutes a trespass

▶ *Guggenheim selects Georgia Tech* From 27 grant requests received from educational institutions in the South the Georgia School of Technology, Atlanta, has been picked by the Guggenheim Fund to receive $300 000 for an aeronautical engineering center

▶ *No 43 to Diesel* Packard's 9-cylinder radial air-cooled, Diesel engine, with a rating of 225 hp at 1 900 r.p.m., is awarded approved type certificate

▶ *Disagree on "rider"* Indiana and Washington do not favor insurance "rider" which states only net reserve of policy be paid in case of death in a plane crash District of Columbia does

▶ *A loss to the Navy* Lieut Alford J Williams, famous Navy flier resigns

Airports and Airlines

▶ *Test pick-up* Post Office Department officials at Washington observe more than one hundred and fifty demonstrations of the Adams air mail pick-up device at Hoover Field Bags up to 125 lb lifted some attempts in wind and rain fail

▶ *The prairie mail.* Western Canada Airways Ltd. starts mail plane service between Winnipeg-Calgary-Regina, 750 mi.; and branch line from Regina to Edmonton, 450 mi

Foreign

▶ *The light plane tour* Great Britain France, Spain Poland Czechoslovakia Switzerland and Germany have planned to enter the European Light Plane Tour, July 20-31 Italy and Roumania not to compete Aero Club of Germany has charge of the event.

Approve Three More Schools

WASHINGTON (D C) — Three schools have been added to the approved type list and are as follows Curtiss Wright Flying Service, Miami Municipal Airport, Miami, Fla., ground and flying Transport, Limited Commercial, and Private Universal Flying School, Cleveland Airport, Cleveland, Ohio, ground and flying, Transport, Limited Commercial and Private; Curtiss-Wright Flying Service of California, 46th and Colorado Blvd., Denver, Colo, ground and flying, L C and Private

States Disagree On Use Of Aero Insurance "Rider"

WASHINGTON (D C)—Thomas M Baldwin, Jr, superintendent of insurance in the District of Columbia, has approved a "rider" which would limit the amount payable on insurance policies to the reserve value of the policy in case of death through an airplane accident H O Fishback, state insurance commissioner of Washington and Clarence C. Wysong, Indiana state insurance commissioner, have stated that such a "rider" will not be allowed in their respective states. However, Mr Wysong feels that the law should be changed.

These statements have been made following the decision of the New York Court of Appeals in a case involving the Metropolitan Life Insurance Co in which the use of the "rider" was upheld.

A "rider" on life insurance policies which provides that death of fare-paying passengers on aircraft is a risk to be assumed by a policy, but the death of aviators or those who indulge in casual and unsupervised flights is a risk not to be assumed has been given the approval of C S Younger, state superintendent of insurance for Ohio.

Packard Diesel Granted Approval

WASHINGTON (D C) — Approved Type certificate No 43 was issued by the Department of Commerce on March 3 approving the 9 cylinder, radial air-cooled aircraft diesel engine developed at Detroit by the Packard firm. The rated horse power of the plant, which is designated as the Packard Diesel DR-980 is 225 hp at 1 900 r p m The dry weight of the engine is 510 lb giving a unit weight of 2.27 lb per hp

Fund Surveys Air Insurance

Favors Fact-Finding Agency; 109 Firms Write Air Policies

NEW YORK (N Y)—In a report on "Aviation and Life Insurance" issued by the Daniel Guggenheim Fund for the Promotion of Aeronautics it is recommended that a statistical, rating and legal agency be established in a central location to maintain and disseminate aviation mortality experience tables and to select, classify, and adjust all aviation risks

A group of insurance firms interested in aviation risk or the aviation industry as a whole should sponsor such an agency, suggests the Fund, and issue information on the subject

The survey is the work of Capt Ray A Dunn, U S Army Air Corps and is said to be the first complete analysis of its kind ever made of aviation mortality

The study includes 31 charts giving hitherto unavailable official flying and fatality statistics which indicate a great increase in the degree of safety during recent years.

Risk Concept Called Faulty

In commenting on insurance company questionnaires to be filled in by applicants for aviation insurance, the report says "It can be seen from these that the insurance industry does not have a true conception of the hazards of aviation or the relative degrees of risk The general conclusion to be arrived at in the investigation of the experience of insurance companies in the United States is that they are attempting to write a new and hazardous risk without the technical and practical advice of people trained in the aviation industry

"In the aeronautical industry life insurance is a most important subject. While in most cases coverage can be secured, the costs are often prohibitive. The result has been that the majority of those engaged in aviation are not now properly protected by insurance

"To the general public, the aviation risk appears greater than it is because of the reluctance on the part of the insurance industry to protect that risk This creates a tendency for the public to believe that if the great insurance minds, having full knowledge of the hazards of all things, do not condone a risk, then that risk is extra hazardous With this in mind, many people do not fly The aviation industry suffers in consequence."

The survey shows that in the United States and Canada 109 companies write aviation insurance policies Sixty companies write policies for pilots 84 for

(Concluded on Next Page)

Define Air Rights In Massachusetts

Altitude of 100 Ft. or Less Over Private Land, Illegal

BOSTON (MASS)—In a decision handed down by the Massachusetts Supreme Court recently it was declared that flying over private property at an altitude of 100 ft or less constituted a trespass and entitled the owner to damages. This is the first time that a court of final jurisdiction has so definitely deprived the law of aerial trespass.

The case in question concerned a bill of equity filed by Harry Worcester Smith and others against the New England Aircraft Co, Inc, Worcester Airport Inc, Worcester Flying Club J Henry Reynolds and James P Whittall. Smith had contended planes of the above companies and persons had flown too low over his property at North Grafton though no money damages were sought by the plaintiff, and no injunctive relief favored by the bench.

So the bill was dismissed as previously ordered by Judge Henry K Lummus though his decision to have the plaintiff pay the defendants $600 in litigation costs was reversed by the full court and the costs will be born in the usual way.

Since the case started a statute has been passed in Massachusetts raising the minimum height for airplanes in flight from 500 to 1 000 ft.

Part of the court's report follows—

"The facts show intrusion upon the land of the plaintiff by flight of aircraft at these low altitudes by aides and by the presence of aircraft and its occupants. These interferences create in the ordinary mind a sense of infringement of property rights which cannot be minimized or refused.

Airport Areas Discussed

"The combination of all these factors seem to us, under settled principles of law after making every reasonable legal concession to air navigation as commonly understood and as established under the statutes and regulations here disclosed to constitute trespass to the land of the plaintiff as far as concerns take-offs and landing at as low as 100 ft.

"Air navigation so important as it is cannot rightly levy toll upon the legal rights of others for its successful prosecution. No reason has been suggested why airports of sufficient area may not be provided so that take-offs and landings of aircraft may be made without trespass on the land of others.

"If it is in the interest of aerial navigation rights of flight at such low altitudes over land of others are of sufficient public importance doubtless the power of eminent domain for acquisition of rights of way in air spaces might be authorized.

"We do not decide whether or to what extent flight by aircraft over private land at a lower altitude than 500 ft may be authorized in the exercise of the police power as already pointed out existing statutes and regulations do not go to that extent.

"The final point to be determined is whether the circumstances are such as to require injunctive relief. Although there appears to have been a considerable number of trespasses by aircraft it seems plain that they are not in the same place in linear space or altitude.

"In the nature of things the flights of aircraft must vary with wind and load. No prescriptive right to any particular way of passage could be acquired in these conditions.

"Upon the findings of the master there is no sound ground for injunctive relief on the theory that the acts of the defendants constitute a nuisance. The law affords no rigid rule to be used as a test in all instances of alleged nuisance. It requires only that which is fair and reasonable in all the circumstances.

"The noise, proximity and numbers of aircraft have not been such in the case at bar to be harmful to the health and comfort of ordinary people. Fright and apprehension of personal danger or of injury to livestock or property are not present. We do not understand the plaintiffs to contend to the contrary.

"The court takes judicial notice of facts of common knowledge concerning navigation of the air in the present state of the art. It is impossible to confine flights to the space over existing public ways."

Airmarked Trucks Aid Flying Manager

HAVELOCK (NEB)—Here is one of the latest twists in airmarking. Parker B Abbott general sales manager for the E H Edwards Co, manufacturer of wire and wire rope, has had large letter "E's" painted on top of the firms trucks. Thus, when Mr. Abbott who flies an Arrow Sport Trainer in covering business territory, spots an "E" moving on the high way below he checks off the position of his representative. At times, he drops down for a business chat.

Peru Gets Three Boeing 40-B's

SEATTLE (WASH)—Three Boeing 40 B's have been shipped to the Peruvian government for use between Paruvian seacoast cities and the interior.

Survey Air Insurance

(Concluded from Page 535)

passengers 60 for both pilots and passengers 57 for owners of airplanes 56 for pilots, passengers, and owners of airplanes 32 for student pilots and 32 for pilots passengers, owners and students. No company will write policies exclusively on pilots, and 24 of the 84 accepting passengers will accept passengers only.

"From a study of the ratings employed for the aviation risk" the report states "it will be found that there was no uniformity in either the system of rating or the rates proper. It can be seen also that the relative degree of hazard had not been determined properly in many cases before ratings were made."

In concluding the survey says "The Fund believes that sufficient statistics are now available to permit the insurance industry to properly classify the aviation hazard. The statistics available may not be in such shape as to be of use for actuarial purposes but they can readily be converted to meet the needs of the actuaries. Classification of the aviation risk should be made and uniform ratings proposed accordingly."

Alliance to Become Warrior Aeronautical

ALLIANCE (OHIO)—After being closed for five months through lack of operating funds the Alliance Aircraft Corp is being reorganized and refinanced as the Warrior Aeronautical Corp. for the manufacture of two- and three-place planes.

Negotiations have been completed by a creditors' committee of the Alliance firm, whereby, according to the report, James D Campbell A. A. Edward Kunzl and Kenneth M. Ronan will take over the Alliance company and refinance it under the new name. These men have been identified with the Stinson company.

An application is to be filed with the secretary of state at once for a charter for the new company, authorizing the issue of 100 000 shares of no par stock. This will provide a figurative sum of $1,000 000 at $10 per share.

Stockholders of the Alliance Aircraft Corp will receive stock in the new firm while creditors of the old company will, it is stated, receive part payment of claims. Arrangements will be made for the liquidation of all accounts.

To Offer Argo

The three promotors are to provide $100 000 at once for the resumption of activities at the plant while Alliance stockholders will provide $50,000. Work on the two place Argo craft will be resumed while designs will be made for a three-place machine. It is expected the factory will be in full operation within 30 to 60 days with a schedule of two craft per week.

Terms of the contract are to be submitted to stockholders for approval at a meeting here March 18, and will also be submitted to creditors at a meeting the date of which has not yet been set.

Campbell is to be in charge of sales for the new company, Kunzl will be the treasurer and Ronan will be the chief engineer and factory manager, it is announced.

Hunt Gliding Site by Air

NEW YORK (N Y)—A suitable site for the first annual Gliding and Soaring Carnival of the National Glider Association will be sought from the air, it is announced. A committee headed by Alexander Klemin director of the Daniel Guggenheim School of Aeronautics, N Y University will endeavor to locate a sector favorable to gliding within or near the Metropolitan area, flying over New York New Jersey, Connecticut and Pennsylvania territory.

New Cirrus Engine Approved

WASHINGTON (D C)—American Cirrus Engines Inc has been awarded approved type certificate No 44 on its Cirrus Mark III supercharged engine. The plant is a 4 cylinder in-line unit developing 110 hp at 2 100 r p m.

Guggenheim Grant Goes to Georgia Tech

NEW YORK (N Y)—Georgia School of Technology, Atlanta has been selected to receive the $300,000 Guggenheim grant for the establishment of an aeronautical engineering center. This decision has been announced by the Committee of Trustees, appointed by Ambassador Harry F Guggenheim, following several months of survey work.

A group of four of the trustees investigated the 27 requests received by the Fund from southern educational institutions. As well as personally inspecting the seats of learning, expert opinion was sought from those in a position to judge which institution was best suited to carry out the type of work contemplated in the Fund's plan.

By the process of elimination after giving due consideration to geographical location, aviation environment, cosmopolitan characteristics of the student body, engineering requirements and the Fund's stipulations the group of institutions under consideration was reduced to three and then finally to the winner—Georgia Tech.

This award is the final act of the Daniel Guggenheim Fund for the Promotion of Aeronautics which officially ceased to exist Jan 31. However, several final reports are yet to be made.

Approximately $1,500 000 in grants have now been made to educational institutions by the Fund. The list is as follows

California Institute of Technology	$350 000
Harvard University Graduate School of Business	10 000
Massachusetts Institute of Technology	264 000
Leland Stanford University	195 000
University of Michigan	78 000
University of Washington	290 000
Georgia School of Technology	300,000

Previous to the organization of the Fund Mr Guggenheim established the Daniel Guggenheim School of Aeronautics, at New York University.

Aero Supply Net $223,418.02

COLLEGE POINT (L I, N Y)—Aero Supply Mfg Co, Inc reports sales last year totalled $1 988 547 83, and profits before deducting depreciation taxes, etc, amounted to $329 523 44, or a net profit of $223 418 02 after all charges. As of Dec 31, the total capital stock outstanding constituted 20-913 shares of class A and 391,261 shares of class B. This report covers the business done by National Steel Products Co. Dayton, Ohio, and the Standard Automatic Products Corp of Corry Pa, subsidiary firms purchasing during 1929.

New Standard Orders 100 K-5's

GLENDALE (CALIF)—Kinner Airplane & Motor Corp reports the order of 100 K-5 power plants from the New Standard Aircraft Corp, Paterson, N J, to be used in the D-29-A Standard Training plane.

Parks' Employees Insured

EAST ST LOUIS (ILL.)—Under an arrangement made possible by the Detroit Aircraft Corp, all employees of Parks Air College were recently insured under a group insurance plan at approximately one-half the regular premium cost. Department heads and pilots were permitted a maximum of $5 000 insurance other men employees, $2,000, and women workers, $1 000.

Initial American S-55

FIRST OF THE American-built Savoia-Marchetti S-55's this flying boat was recently tested and christened "Port Washington" in honor of the Long Island town at which the American Aeronautical Corp, manufacturer is located. William B Atwater piloted the plane on its initial flights.

The S-55 is a passenger carrier developed from the original type in which De Pinedo crossed the Atlantic and which is used extensively by the Italian Navy for bombing work. Two Isotta-Fraschini 500 hp water-cooled engines fitted in tandem power the craft. The twin-hull arrangement obviates the need for wing tip floats.

Truscon Earnings Increase

YOUNGSTOWN (OHIO)—Earnings of the Truscon Steel Co., available for dividends after the deductions of all charges including federal income tax for 1929 amounted to $2,751 409 equal to $4.04 on 618 848 shares with a $10 par, compared with $1 970 181 or $3 12 a share on 548 000 shares in 1928. Of last year's earnings, however, $454 045 represents profits from the sale of 70 per cent of stock owned by Truscon in its Canadian subsidiary to Wood, Grundy & Co of Toronto. The balance sheet reveals an increase in assets from $18 730 083 at the end of 1928, to $19,885 939 at the end of 1929.

To Hold Symposium During Cincinnati Show

CINCINNATI (OHIO)—During the aircraft show to be held here March 26 April 1, an American Symposium on Aviation will also take place to consist mainly of addresses by prominent aviation leaders with general discussion of the topics to follow. While the show will be held at Cincinnati's Music Hall, the Symposium will convene at the Hotel Sinton.

One of the features of the Symposium will be a three day conference of officials from eleven large cities for the purpose of deciding what a city's attitude toward municipal airport activities should be. This will be known as the Municipal Policy Meeting.

The following four subjects will be gone over by this group

(1) What shall be the city's policy toward the aircraft manufacturer? (Discussed by municipal representatives, a prominent manufacturer, and a representative of the Chamber of Commerce.)

(2) What shall be the city's policy toward the non transport operator? (Discussed by a non-transportation operator and a representative of the Chamber of Commerce.)

(3) What shall be the city's policy toward the airline operator? (To discuss this question a high official of The Aviation Corp, a representative of the Goodyear-Zeppelin Corp, a prominent official of an air rail transportation system, municipal representatives and a Chamber of Commerce representative have been scheduled to speak.)

(4) What steps shall the city take toward the making and enforcing of regulations governing the operation of aircraft? (This question will be discussed by operators municipal representatives and a high official of the Department of Commerce.)

Taking part in the Symposium conference will be such notables as F Trubee Davison Assistant Secretary of War Senator Hiram Bingham, president of the National Aeronautic Association, John Vorys State Director of Aviation for the Department of Commerce and many mayors, city managers, and Chamber of Commerce officials from the key cities.

Name Those in Charge

B G Bodenhoff is managing director of the aircraft show and Symposium. The committee headed by Speaker Nicholas Longworth as honorary chairman, includes William Earle Stillwell, Jr., executive chairman, C W De Forest, of the Columbia Engineering and Management Corp executive engineer; H C Blackwell, president, Union Gas & Electric Co; Col C O Sherrill, Cincinnati city manager; William Licht, president, Cincinnati Chamber of Commerce, Herman Schneider, president University of Cincinnati; Maj Bradley Jones professor of aeronautical engineering, University of Cincinnati; Charles P Taft II; Capt Wright Vermilya; E A Oster president, Engineers' Club, and J J Castellini, president, Brotherhood of Railway Clerks' National Bank.

Navy Orders 72 Cyclones

PATERSON (N J)—Wright Aeronautical Corp has received an order from the Navy calling for 72 Cyclone engines, to cost $600 000.

Sergievsky Breaks Altitude-Load Mark

Also Flies Hornet Sikorsky To U. S. Speed-Load Record

NORTH BEACH (L. I., N. Y.)—Two seaplanes records were established by Capt. Boris Sergievsky, chief test pilot for Sikorsky Aviation Corp. on March 4 and 5, in a Sikorsky S-38, powered with two Pratt & Whitney Hornets of 575 hp. each.

Carrying 2,000 kg (4,409.24 lb.) he reached a height of 19,500 ft. in a flight over North Beach, Queens, lasting 1 hr. 24 min. If calibration of the barograph at Washington reveals this figure as correct, Captain Sergievsky will have far exceeded the former record of 15,837 ft., set by Lieutenant de Vaisseau, Paris, France, in a Hispano-Suiza powered C.A.M.S. The old American record, made in a PN-12, with two Hornet engines, was 15,426 ft.

The Sikorsky had been turned into a seaplane by removing the landing wheels and room for the ingot iron load carried to meet load specifications was made by removal of seats.

Plans Other Attempts

This first record-breaking flight was made Tuesday, March 4, and the following day, over a course between Executon Light and Fairfield Conn., Captain Sergievsky, travelled at the rate of 132.5 m.p.h., with the same 2,000 kg. load. Though this mark far exceeded the old American 100 km. (62.5 mi.) record of 92.53 m.p.h., made in a PN-10, with two Packard 600 hp. engines, it did not establish a new world record, as a plane must fly at least 5 m.p.h. better than the existing mark to be credited by the F.A.I. as official. Richard Wagner, Germany, now holds the 100 km. mark of 130.1 m.p.h., made with a Dornier Superwal, Gnome-Rhone-Jupiter powered, in January, 1928.

Captain Sergievsky plans shortly to try for a new altitude record for seaplanes carrying the 1,000 kg. load and also for a new speed mark for craft so loaded.

The Captain's flights have been observed by Maj. Luke Christopher, secretary of the N.A.A. Contest Committee.

New Furnace for Aluminum Firm

WAUKESHA (WIS.)—The installation of new heat treating equipment consisting of a General Electric furnace capable of heating 1,500 lb. of aluminum castings at once, has been completed by the Quality Aluminum Casting Co., this city, which makes alloy castings for aircraft use.

Half of Legion Air Chapel Fund In

TRENTON (N. J.)—The American Legion's drive for $150,000 to raise a memorial chapel to aviators at the Lakehurst Naval Air Station has been more than 50 per cent subscribed for, it is announced.

Pacific Show Sanctioned

OAKLAND (CALIF.)—June 26 to July 6 has been officially set by the Aeronautical Chamber of Commerce as the dates for the Class "C" Pacific Coast Aeronautical Exposition to be held in this city. William P. Butler is managing director of the exposition which will be held at the Oakland Municipal Airport. Show information may be obtained from Joseph M. Parker, General Manager of the Oakland Chamber of Commerce.

Aero Underwriters Netted $204,432 in '29

NEW YORK (N. Y.)—The second annual report of Aero Underwriters Corp., for which Barber & Baldwin, Inc., is the subsidiary underwriting agency, has been made public by Horatio Barber, president. Aero Underwriters, formed in the latter part of 1928, now includes nineteen companies and subsidiaries.

Excluding premium income flowing to reinsurers, for the twelve months ended Dec. 31, 1929 a total income of 1,051,402 was reported, while total disbursements had amounted to $846,970, leaving a net trade profit of $204,432. The profit figure is raised to $282,256, however, by adding the corporation's equity in the premium reserves which, calculated on a customary basis, amounted to $77,824.

Since the end of last year, it is stated the company has recovered more than $70,000 of the loss encountered as disbursement during the stock market depreciation. On Dec. 31, 1929 the market value of listed securities held by the Underwriters and its subsidiaries, was $3,111,233 and cash on hand amounted to $462,908. After deducting all liabilities the net value of assets on that date represented $31.93 for every share of Aero Underwriters Corp. stock issued.

Arrange Pennsylvania Tour

PHILADELPHIA (PA.)—It is expected that 25 planes will enter the first Pennsylvania Goodwill Air Tour to be held May 30-June 8, tentative plans calling for approximately twenty stops throughout the state. The tour is being arranged under the management of John H. Witherow, Fidelity-Philadelphia Trust Bldg., this city. Efforts are being made to secure sanctions from the N.A.A., the State Aeronautics Commission, and the U. S. Department of Commerce. Members of the Aero Club of Pittsburgh and the Philadelphia Aero Club, which are sponsoring the tour, are as follows: John Vickers, chairman, for Pittsburgh; William J. Austin Hasley, R. Bazley, James D. Condon, Lorin Faurot, John P. Morris and Edward W. Thompson; for Philadelphia: Robert E. Lenton, Graham S. Mason, Charles Denby, Jr., J. Wesley Smith, Ellwood J. Turner and Robert P. Hewitt.

Subcommittee Reports Favorably on Bingham Bill

WASHINGTON (D. C.)—Despite requests by the Department of Commerce for modifications of the provisions of the Bingham Bill regarding the publication of accidents to interstate flying aircraft, a subcommittee of the Senate Commerce Committee recommended on March 6 that the measure be taken up by the Senate without substantial changes in its form. It is expected that the bill will be endorsed by the full committee at the next meeting and will be placed on the Senate calendar for action as soon as disposition has been made of the tariff measure and the appropriation bills.

The report of the subcommittee, which was prepared by Senator Howell of Nebraska, its chairman, recommends that some of the features of the bill be made more strict. This is in respect to the section dealing with the destruction of evidence in connection with an air crash. It is proposed in the report that a penalty shall be provided for the removal, destruction, or mutilation of any evidence of value on the scene of an accident to an interstate flying aircraft involving personal injury or death. This penalty would be a fine, imprisonment, or both.

An exception would be made in cases where the evidence is destroyed by a duly authorized officer or employee of the Department of Commerce, or for the purpose of preserving or protecting human life. It is also provided that the penalty provision shall not apply if the Department fails to investigate the accident within three days after the scene of the crash has been ascertained.

North American Issues Report

NEW YORK (N. Y.)—After provision for income taxes, a net profit of $1,908,819.42 is reported by North American Aviation, Inc., as of Dec. 31, 1929, which figure also includes the net earnings of firms wholly owned by North American. Adding an $8,858.60 surplus carried over from the previous year, the total earned surplus as of Dec. 31, was $1,917,678.02. Reserves of $250,000 have been set up from this amount to care for contingencies that may arise in the pioneering work of the company. North American owned open market securities costing $14,688,998.13 at the close of the year, while their market value on that date was $6,813,040.27. On March 1, 1930, after providing for all contingencies the book value of North American stock was $10.68 per share as compared with a value of $9.40 per share on Dec. 31 last.

N.A.T. Net $669,295 in 1929

NEW YORK (N. Y.)—A net income of $669,295 for 1929, equivalent to $1.03 per share on 650,000 no-par shares, including 50,000 shares reserved for sale to employees, is reported by National Air Transport.

NEW PLANES

Following two years construction work, a low wing, full cantilever type, double cockpit, monoplane of his own design has been finished by Alexander Krapish, chief test pilot for the Moth Aircraft Corp., Lowell, Mass. Following the Moth in fuselage design, the plane has a span of 30 ft., is 24 ft. overall, and has detachable wings which taper from 72 to 24 in. Wright Gipsy power is used.

An announcement is made that the Inland Aviation Corp., Kansas City, Mo., is producing a new plane to be powered with the new Warner Scarab Junior 85 hp. engine. Willfred G. Moore, sales manager, states performance tests will soon take place on the new craft.

A six-place, all metal monocoque monoplane is being completed by Harvey Crawford, veteran airplane builder in Los Angeles. The plane, to be powered with a Wright J6-7, is being specially constructed to order and is of corrugated dural throughout. Full cantilever landing gear is employed.

The second of two experimental airplanes manufactured by the Joy Manufacturing Co., Franklin, Pa., has successfully passed all tests, and interests identified with the concern have organized and incorporated the Franklin Aircraft Corp., headed by W. E. Burrow. Production of planes will be begun on a quantity basis it is stated. Aluminum enters heavily into the materials used in the construction of the new planes, the gross weight of which are 1,425 lb., equipped with two radial air-cooled engines.

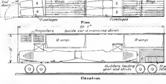
Delivery of a Travel Air low-wing "S" to James Doolittle will take place shortly, it is announced. Deviations from the original "S" craft include larger control surfaces, cockpit cover, instruments for blind flying and a special arrangement of gasoline tanks.

Curtiss Reid Aircraft Co., Canada, has completed its first all metal plane and the machine has been purchased by the Montreal Light Aeroplane Club. The firm is now producing these craft in quantity.

Trial flights are expected to be made soon in a low-wing monoplane being built by D. K. Stephens and W. G. Rufiy, of Fort Pierce, Fla., under the direction of Ralph Daugherty, Pittsburgh, Pa. The craft with a spread of 32 ft. and a fuselage 20 ft. long, is to be powered by a 70 hp. radial engine.

Vance Breese, Pacific Coast pilot and designer is builder of a plane constructed especially for mail service which was recently tried out at Alameda Airport, Alameda, Calif. The craft, a monoplane is powered with a Wright Whirlwind J6-9 engine.

Six Moths to a Carload by New Arrangement



THAT AIRPLANES can be shipped by rail with added efficiency in the disposition of space was proved recently by the Boston & Maine Railroad which secured consignments of Moth planes from Lowell, Mass. The usual shipments contained only four planes per car, but working with the Moth people, the research department found a way whereby six planes could be shipped in a car 50 ft. 6 in. in length. The schematic drawing above illustrates the method employed.

The fuselages of the planes are packed side-by-side at each end of the car while the wings, rudders, landing gears, and propellers are stored in the remaining space. The wings are supported from the roof of the car by 4 in. strips of fabric webbing and are securely braced with heavily padded wooden supports. The landing gear, empennage units, struts and wheels are packed and padded in the far end of the compartment.

Fuselages are mounted on wooden skids and bolted to the floor, with bracing at both ends and with noses of the planes facing the ends of the car. Propellers are bolted to boards which are in turn nailed to the wall at the end of the car and above the fuselages.

Name Tentative Route For New England Tour

SPRINGFIELD (MASS.)—Plans for New England's Air Tour sponsored by the Aeronautical Development Committee of the New England Council, are rapidly taking shape and the schedule of events for the dedication program of the Bowles Airport, which will be managed by the Springfield Chapter of the N.A.A., has been submitted to the National Aeronautic Association Contest Committee for approval.

According to the proposed program worked out by the Air Tour Committee and the associated Technical Advisory Committee the tour will start from the Springfield (Mass.) Airport on Tuesday, May 27, and will end at Bowles Airport, in Springfield, on Friday, May 30. Bowles Airport will be dedicated Memorial Day, and on May 31 and June 1 the air race meet is scheduled to take place there.

Starting from Springfield Tuesday morning, May 27 the first day itinerary includes Holyoke, Northampton, Greenfield and Turners Falls, Mass.; Brattleboro, Vt.; Keene, N. H.; Bellows Falls and Springfield, Vt.; Claremont, N. H.; Windsor and White River Junction, Vt.; Hanover, N. H.; Montpelier, Barre, Burlington, St. Albans, Swanton and Newport, Vt.; Lancaster, Littleton, Plymouth, Laconia, Franklin and Concord, N. H.

The second day calls for stops at Rochester, N. H.; Sanford, Auburn, Lewiston, Augusta, Camden, Rockland, Bath, Brunswick, Portland, Saco and Biddeford, Me.; Dover, Portsmouth, Manchester and Nashua, N. H.; Lowell, Lawrence, Boston, Brockton, Taunton, and New Bedford, Mass.

Tour Ends Memorial Day

The route for Thursday, May 29, comprises Fall River, Mass.; Providence, R. I.; New London, New Haven, Bridgeport, Danbury, Waterbury, Meriden, New Britain and Hartford, Conn. The final lap on Memorial Day will be from Hartford to Springfield.

Final details of the air tour will be determined at a meeting of the New England Council's Aeronautical Development Committee, the Air Tour Committee, of which Col. James T. Gilson, of Hartford, is chairman, and the Technical Advisory Committee headed by Capt. C. M. Knox, of Hartford.

Nineteen events are proposed for the air race program at Bowles Airport, on May 31 and June 1, cash prizes of $7,000 being offered to contestants in ten events. The remaining nine events of the two-day program are exhibition and service events in which only members of Army, Navy and National Guard planes will participate.

P. & W. Opens West Coast Offices

LOS ANGELES (CALIF.)—West Coast offices in the new administration building at the United Airport have been opened by the Pratt & Whitney

Name New Directors Of National Aviation Corp.

NEW YORK (N.Y.)—F. B. Rentschler, president of U. A. & T.; Edward V. Rickenbacker, vice-president of the Fokker Aircraft Corp.; Louis H. Seagrave, president of the American Founders Corp.; A. C. Dickinson, president of Sikorsky Aviation Corp.; George E. Devendorf, vice-president of the American Founders Corp.; O. A. Glazebrook Jr., of G. M.-P. Murphy & Co., president of Aeronautical Industries, Inc.; John M. Lee, of the American Founders Corp.; and Ashton W. Hawkins, president of the United States & British International Co., Ltd., are the new directors recently elected to the board of the National Aviation Corp. at a meeting of stockholders.

Those at the meeting authorized an increase in capital stock of the company from 500,000 to 1,000,000 shares. The plan of exchanging National Aviation stock for that of Aeronautical Industries, in accordance with terms stated on Feb. 8, in a letter to stockholders, was also approved.

A meeting of the new board will be held shortly at which time the election of officers will take place. The directors recently re-elected to the board were Carle C. Conway, George W. Davison, Thomas N. Dysart, Col. Paul Henderson, George Houston, Richard F. Hoyt, C. M. Keys, Charles L. Lawrance, Paul W. Litchfield, E. O. McDonnell, John J. Mitchell, Jr., G. M.-P. Murphy, Earle Hay Reynolds, Harold E. Talbott, Jr., and James C. Willson.

A.S.M.E., R.A.S. Form Alliance

NEW YORK (N.Y.)—Word comes of an alliance reached between the Royal Aeronautical Society of Great Britain and the American Society of Mechanical Engineers. The two groups will exchange aeronautical material in order to keep each other posted on developments and progress. Capt. J. Lawrence Pritchard is secretary of the British Society which was founded in 1866 and now includes the Institute of Aeronautical Engineers. The A.S.M.E., which now has an enrollment of 2,300 aeronautical and mechanical engineers, will celebrate its fiftieth anniversary this year. The organization took an interest in aviation from the start, though its Aeronautics Division was not formed until 1920.

Flying Agents Need Introduction

WASHINGTON (D.C.)—Since mining companies appear to resent intrusion by "strangers," the Department of Commerce has issued a suggestion that salesmen who fly to lumber, mining, and construction camps in the wilds of Canada take a letter of introduction with them, addressed to the superintendent. It is said a number of firms are cultivating a far-north market, the agents using the railroad as far as possible and flying the remaining distance.

Martin Boats to Be Ready in May

BALTIMORE (MD.)—The delivery of Martin flying boats manufactured by the Glenn L. Martin Co. will begin about the end of May, according to J. G. Gosling, a director of the Martin firm. More than 1,100 men are now employed in the flying boat division, and orders on hand, most of which are from the Navy Department, indicate the company's business will be absorbed until well into the fall. Within the next few months, it is expected that the force will be increased to between 1,700 and 1,800. Plans are being made to enter the commercial and private flying boat field.

Seek 1931 Increase For Canada Air Budget

OTTAWA (ONT.)—An increase of $1,554,538 or about 26 per cent is shown in the estimates for 1931 for aviation, according to the budget being discussed in the House at present. For the forthcoming fiscal year, the amount required is $7,475,700, as compared with $5,921,163 for the current year.

One of the principal items of increase is the provision caring for air mail routes, there being an increase of no less than 227 per cent, the required appropriation being $900,700, as against the $274,500 voted last year.

The civil air operations appropriation, covering costs for forest fire prevention work and air photographic surveys, is $4,065,000 as compared with $3,698,969 last year, an increase of $366,031.

The appropriation for the maintenance of the Royal Canadian Air Force has been increased by $562,306, the amount being $2,510,000 as compared with $1,947,694 in the previous estimate. This figure covers all expenses in connection with the R.C.A.F., including training of personnel for civil air operations and the provision for necessary aviation facilities.

Model Meet Finals Oct. 10-11

NEW YORK (N.Y.)—Finals of the Fourth National Playground Miniature Aircraft Tournament are to be held in Atlantic City, N. J., Oct. 10-11, it is announced. Conducted by the Playground and Recreation Association of America, this city, and sanctioned by the N.A.A., its committee includes the following: Orville Wright, chairman; Col. Charles A. Lindbergh, associate chairman; Porter Adams, Rear Adm. Richard E. Byrd, F. Trubee Davison, Amelia Earhart, Henry Ford, Ambassador Harry F. Guggenheim, Clifford B. Harmon, Joseph Lee, William P. MacCracken, Jr., Theodore Roosevelt, and Edward P. Warner.

Firm Builds Planes to Order

BOSTON (MASS.)—New England Air Transport Co., 80 Federal St., is now contracting to build planes to order, taking repair work, and rebuilding planes.

Williams to Leave Navy; Plans New Speed Attempts

WASHINGTON (D.C.)—Attempts to again claim for this country lost air speed records are to be made by Lieut. Alford J. Williams, whose resignation from the Navy has been approved by Acting Secretary of the Navy Jahncke and Lieut. Comdr. J. H. Towers, Acting Chief of the Bureau of Aeronautics. The resignation will become effective in two months. Lieutenant Williams' decision to leave the Navy, where for the past seven years he has conducted valuable experimental and speed tests on various types of aircraft, followed orders which called for his transfer to sea duty on the aircraft carrier "Lexington" as department regulations prescribe sea duty for all officers of the Navy.

America's land plane speed mark of 266.59 m.p.h. is held by Williams and was made in November, 1923, at Mitchel Field, Long Island, N. Y. The Seaplane racer "Mercury," developed by Williams for last year's Schneider Cup Races, after unsuccessful trial tests, was not entered in the speed classic. He plans to compete in the 1931 Schneider Races, however.

Lieutenant Williams attended Fordham and Columbia Universities and was formerly a baseball pitcher with the New York Giants. He joined the Navy at the outbreak of the World War and received his flight training at Pensacola, Fla. The retiring Navy flier is holder of the Distinguished Flying Cross.

Vote Again on School Policy

MILWAUKEE (WIS.)—Feeling that the 17 to 15 vote by which recommendation to have the states regulate aviation schools was defeated at the Mid West States Air Parley here was not an adequate expression of the sense of the conference, a new poll is being taken by mail. The poll is under the direction of John M. H. Nichols, general chairman of the parley, and executive vice president of the Milwaukee chapter of the N.A.A., parley sponsors. The conference originally approved state air school control when it sent a suggested resolution to the resolution committee by a vote of 2 to 1. The resolution became mislaid and when its loss was discovered the parley was about to adjourn and it could not be submitted in approved form, while many of those who had originally voted on it had departed.

Shell Has New Service Truck

INDIANAPOLIS (IND.)—The first of five special airport service trucks to be put in service at various points by Shell has been installed at the municipal airport. The truck has a capacity of 450 gal. of gasoline of three grades each in a separate compartment, has heated containers for oil and greases, two water tanks, pressure pumps for all, an air pump for tires, a small flood light for facilitating night operations and fire extinguishers.

Aero Branch Reports On Air Instruction Costs

WASHINGTON (D.C.)—A report on the cost of flying courses and minimum time required to finish them along with other data on approved type schools, has been prepared and issued by the Aeronautics Branch, following the receipt of answers from approximately 55 per cent of the schools to which the questionnaire was sent.

States the Aeronautics Branch:

On the basis of present returns it appears that the average cost of instruction for private pilot's course is approximately $555 and the average length of time about eight and one-half weeks. The average minimum time for the completion of this course is given as five and two thirds weeks, while the average maximum time is placed at two and three-fifths months.

Reference is made to minimum and maximum time because many conditions enter into the speed or delay with which a student may finish the course. Among these conditions are weather, the adaptability of the student to flight instruction and the availability of the student for classes.

For a limited commercial course the average cost is $1,255. The average minimum time was two and four-fifths months and the average maximum time four and three-fifths months.

For the transport pilot's course, the average cost is $4,264, the average minimum time is seven months, and the average maximum time is eleven and three-fifths months.

The price range for the courses are: Private, $440 to $700; Limited Commercial, $1,850 to $1,350; and Transport, $3,875 to $4,550.

While all of the schools adhere to the standard of minimum requirements established by the Department of Commerce, there are many that go above and beyond this standard and obviously their tuition charges are more. For example, there are some phases of flying and some types of ships that are not specified in the regulations which are included in the courses.

The tuition charges given in the foregoing statements do not include room and board, the average cost of which is around $12 per week. The exact amount depends upon the type chosen by the student, the location and the extent to which he wishes to be provided for.

Discourage Part-Time Instruction

Part-time instruction and plans of prospective students to work their way through are discouraged in general as the schools emphasize the importance to the student of devoting the full allotted time each day to instruction. Some schools have gone so far as to declare a definite policy against part time students.

Prospective students also are urged not to undertake a course unless they have enough money available to pay for their entire tuition and living expenses, also there are other institutions that function under a partial payment plan.

None of the schools replying to the questionnaire agreed to furnish employment for their graduates. While no definite stand was taken on this point, it is understood that such assistance, if forthcoming at all, will depend on the qualifications and adaptability of the graduate.

The question of salary the graduate may expect for his first employment after leaving the school also is regarded as being beyond the pale of the schools activities. The situation in this respect is similar to that of most educational institutions which do not guarantee or promise anything to their graduates in the way of salaries or future employment.

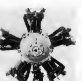
Contract for 60 D.A.C. Gliders

DETROIT (MICH.)—James Work, vice president of the Detroit Aircraft Corp., announces receipt of contracts for 60 primary training type gliders. W. T. Ponder, Forth Worth, Tex., Ryan dealer in that district and William J. Austin, president of the Pittsburgh Aircraft Agency Corp., each contracted for five of the machines.

Flier Awarded Navy Cross

WASHINGTON (D.C.)—For bravery and skill displayed while on flying service in Nicaragua during the revolution, the Navy Cross has been bestowed upon Master Technical Sergeant Archie Paschal of Glendon, N. C. by Acting Secretary of the Navy Jahncke. Paschal completed 1,040 hr. in the air while on duty there and carried approximately 1,700 passengers and 840,000 lb. of freight without mishap over terrain which practically precluded the possibility of a safe forced landing.

Scarab Junior Offered



PRODUCTION OF the five cylinder Warner Scarab Junior engine, shown above, marks the entrance of the Warner Aircraft Corp., Detroit, into the light power plant field. The engine is rated at 85 hp. at 1,950 r.p.m.

Ninety per cent of the standard Scarab parts are embodied in the construction of the Junior model, according to the manufacturer's pamphlet. Here are some of the specifications:

Specific weight, 2.7 lb. per hp.; bore 4.25 in.; stroke 4.25 in.; displacement, 301.4 cu. in.; compression ratio 5.2 to 1; overall diameter, 36½ in.; diameter of mounting ring circle, 17 in. (eight ⅜ in. diameter bolts); ignition, dual Scintilla; carburetor, single venturi with mixture control and heater.

General Instrument Re-Named

LOS ANGELES (CALIF.)—Announcement has been made by Herbert E. Linden, vice-president, that the name of the General Instrument Corp. has been changed to Commercial Instrument Corp. The General concern was organized by Vincent Bendix, president of the Bendix interests, around the American Paulin System, Inc., of this city, originally formed to manufacture the Paulin level flight indicator. The purpose of this new corporation has been to acquire constituent companies manufacturing instruments for aircraft. With the change of name to Commercial Instrument Corp., there has been a move to list the stock of the company on the Chicago Curb.

A.S.M.E. Will Discuss Plane Production Costs

NEW YORK (N.Y.)—Methods of reducing the production costs of airplanes will be extensively discussed by the American Society of Mechanical Engineers at Dayton, Ohio, and Wright Field, during the Fourth National Technical Aeronautic Meeting of the organization, May 19-22.

This will also be the subject of a conference to be held here about May 6 during the New York Aircraft Salon, May 3-10. At that time, talks will center around the "Designing of Airplanes to Reduce Maintenance Costs."

At the Ohio meetings, the following problems will be discussed:

1. "Reduction of Airplane Production Costs," by J. Don Alexander, president, Alexander Industries Corp., Colorado Springs, Colo. Mr. Alexander will discuss "production economics resulting from use of labor-saving short-cuts, utilization of modern machinery, efficient factory planning, and development of jigs, dies, molds, etc., to insure absolute uniformity of unit parts."

2. "Design of Airplane From Point of View of Cheap Production," by Russell F. Hardy, chief engineer, Waco Aircraft Co., Troy, Ohio. Mr. Hardy will discuss "the proper design or type of airplane, including the size of engine, number of persons to be carried, biplane or monoplane, open or closed." He will then show the importance of building a mock-up of the proposed model, engineering procedure, engineering records, and designing interchangeable parts.

To State Commercial vs. Military Angle

3. "Airplane Design, Manufacture, and Commercial vs. Military Sales," by Rex B. Beisel, vice-president and chief engineer, Spartan Aircraft Co., Tulsa, Okla. Mr. Beisel will compare the features, methods, and procedure governing the design, manufacture, and sales of commercial vs. military airplanes. He will suggest remedies for difficulties encountered.

4. "Problems of Airplane Quantity Production," by R. S. Damon, airplane manufacturing engineer, Curtiss-Wright Corp., New York.

The production conference is to be part of a large technical program at Dayton including 30 papers by American and European aeronautic engineers. A special feature of the meeting will be laboratory tests run at Wright Field by the Army Air Service Materiel Division and the A.S.M.E. for the benefit of the visiting engineers.

Hydraulic Approves Merger

CHICAGO (ILL.)—Plans for the acquisition of Hydraulic Brake Associates, Ltd., by Bendix Aviation Corp., have been approved by stockholders of the former company. The basis of stock exchange will be five shares of Bendix for six of the Hydraulic firm according to the announcement.

Aero Branch Operating New Engine Laboratory

WASHINGTON (D. C.)—Approximately 52 power plants a year could be tested in the new engine-testing laboratory of the Aeronautics Branch recently completed at Arlington, Va., states Maj Clarence M Young, Assistant Secretary of Commerce for Aeronautics. This new plant is now in daily operation and is equipped with three modern test stands.

"The new test laboratory at Arlington, which is just across the Potomac River from Washington, was designed especially for efficiency and speed in mounting, testing and inspecting aircraft engines There are three engine testing stands now in operation, which means that the laboratory is capable of testing one engine type per week with the regular engineering staff The output probably could be nearly doubled by the employment of additional engineers should this become necessary

"The three test stands are all under one roof and are located in a long, narrow, one story, modernly constructed, fire proof building Adjoining each test stand is an engineering observers' room fully equipped with modern and valuable instruments From this room the engineer in charge of the test may observe the actual condition of the engine as to temperatures, r.p.m., pounds of fuel consumed, and other important data that enter into the acceptance or rejection of the power plant

State Test Specifications

"Unless an aircraft engine type has been approved as to its airworthiness by the Army or Navy, it must be submitted to the Department of Commerce for approval as to airworthiness for its use in civil aircraft, and must undergo a 50-hr. endurance test which is conducted in ten periods of 5 hr each During the first 5 hr, the engine must be run with the throttle wide open and the speed must be at least equal to the rated speed specified by the manufacturer

The power rating of the engine is then made from the average horsepower developed during the first period During the remaining nine periods the engine is run at approximately 97 per cent of the rated speed and the horsepower developed must at no time be less than nine-tenths of the rated horsepower.

"After successfully passing the required block test the engine is installed in an airplane by the manufacturer and given an actual service test of at least 50 hr in the air which includes a climb at full throttle to the service ceiling of the airplane"

Test Columbus Golden Eagle

COLUMBUS (OHIO)—The Golden Eagle Aircraft Corp, which recently moved here from Inglewood, Calif, has tested the first plane turned out at the Columbus factory

Gas Shortage Halts Airminded Eskimos

OTTAWA (ONT.)—On a recent plane trip to Aklavik, North West Territories, C H Dickens, chief pilot of Western Canadian Airways, Ltd, inaugurated Far-North Barnstorming by taking Eskimos for 10-min. flights at $10 per man But so many of the Eskimos wanted to fly that the limited supply of gasoline ended the hopping long before the flight seeking Northerners were satisfied to remain on the ground.

Douglas Gets Government Order

SANTA MONICA (CALIF.)—An order for seventeen O-25A observation planes, to be powered with Curtiss geared Conquerors, and spare parts has been received from the government by the Douglas Aircraft Co here The transaction will involve $224,687 91.

S.A.E. Arranges Detroit Aero Meeting April 8-10

DETROIT (MICH.)—An all-American Aircraft Show meeting of the Society of Automotive Engineers has been arranged for April 8-10, during the All-American Detroit Show Sessions will be held at the Book-Cadillac Hotel and the following program has been arranged for the occasion

Tuesday, April 8

ENGINES—10 00 a.m.— "Improvements in Diesel Aircraft Engine Development," Capt L. M. Woolson Packard Motor Car Co Criticism of Present Engines from a Transport Operator's Viewpoint, E P Lott and Wesley M. Smith National Air Transport, Inc

AERONAUTIC BANQUET—6:30 p.m Grand Ball Room, Book-Cadillac Hotel Sponsored by the Detroit Section. Music and entertainment, followed by an address by nationally known speaker

Wednesday April 9

AIRCRAFT—10 00 a.m "How Much Is Lightness Worth in an Airplane E P Warner President of the Society and Editor of AVIATION Construction and Performance of Curtiss Tanager Winner of the $100,000 Guggenheim Fund Prize, T P Wright one of the designers of the Tanager, Curtiss Aeroplane & Motor Co., Inc

GLIDERS—2 00 p m Paper and discussion on design and engineering in glider construction followed by a bus trip to the Airport where a demonstration of glider flying will be staged

Thursday April 10

10 00 a.m.—Starting from Book Cadillac Hotel a trip by bus to Ford Co. Ford Airport, airplane factory, and museum

Report on Canadian Forest Patrol

WASHINGTON (D. C.)—Since early last year, flying patrols have covered more than 24,000,000 acres of forest in Northern Canada, according to a report from Consul Lee R. Blohm, Regina Saskatchewan

Name Curtiss Dealer At Pittsburgh Exposition

PITTSBURGH (PA.) — Pittsburgh's second annual aircraft show, being held in Motor Square Garden, March 6-15, has gone into the final stages as this is written and pleasing results are developing for the exhibitors from the contacts effected in the earlier days of the spectacle

It was announced that Pittsburgh Airplane Sales Corp, recently formed by Pittsburgh Airways Inc, has been granted the sales rights in Western Pennsylvania, parts of Ohio, and West Virginia for the entire line of Curtiss-Wright planes The new corporation has named agents in various sections of the territory

The company announced further that a Keystone-Loening "Air Yacht" will be brought here in about ten days to operate from a port in the heart of the city on the Monongahela or Allegheny rivers It is planned to establish scheduled hops in the Pittsburgh tri-state district with other flights to river and lake resorts when the spring season opens

It was made known that Rodgers Field, the present municipal airport, has been granted a commercial license through the efforts of Capt John A Morris and his assistant Jack Thompson of the Morris Flying Service A dozen new students have been enrolled in the Morris school and about the same number in the Dawson-Babcock school, which operates from the same field

Pickup Device Attracts Visitors

Penn School of Aviation, a subsidiary of the Pittsburgh Aircraft Industries Corp, reported new students, as did the Pittsburgh School of Aviation and the Curtiss-Wright Flying Service

Accessories are getting a good play along with the gliders Most visitors are attracted to the working model of the Adams air mail pickup device with which the government is experimenting, and the model wind tunnel

Distinguished visitors attended the Aero Club ball held on the second night of the show The exhibition has drawn crowds daily and, according to Ray Krimm, show director, the affair is an even bigger success than last year's show

Plan Cape Cod Glider Contest

BOSTON (MASS.)—An international glider or sail plane contest is being planned for next September, to be held on Cape Cod at South Truro and Corn Hill Officials of the National Glider Association, the Aeronautical Chamber of Commerce, and the American Motorless Aviation Corp are the sponsors Professor Georgii one of the leaders in glider flying in Europe is expected to visit the United States during the coming summer and will bring a number of his best planes and pilots from the Rhoen school near Frankfort, Germany, among whom may be Kronfeld, German world altitude record holder

PERSONNEL

CAPT THOMAS B DOE recently vice-president and general manager, has been elected president of Eastern Air Transport Inc MR. ELLIOTT, operations manager has been elected vice president. C M KEYS is chairman of the board of directors, of which other members are J CHEEVER COWDIN, C. W. CUTHELL. HENRY G HOTCHKISS J A B SMITH, J C WILLSON

LIEUT. COL. JACOB L. WUEST, commanding officer at Langley Field, will succeed MAJ. L. G HEFFERNAN as commanding officer of Chanute Field, Rantoul, Ill Major Heffernan will go on a tour of foreign service

BOROUGH PRESIDENT GEORGE U. HARVEY Queens New York City, has been made a director of New York City Airport, Inc, which is developing a field between Flushing and College Point

E. E FORD recently branch manager for Curtiss-Wright at Fairfax Airport, Kansas City has been promoted to the position of Southwest district manager of the photographic division.

E. D FOX inspector for the Aeronautics Branch in Omaha, has been transferred to St Louis He will be replaced by LESTER BISHOP, recently air mail pilot for Thompson Aeronautical Corp

KARL S BETTS has been appointed assistant general sales manager, in charge of dealers and distributors, for Detroit Aircraft Corp

SAMUEL TAYLOR and JAMES O JOHNSON Stout Air Service pilots, have resumed duty on the Detroit-Cleveland run, after spending six months in Philadelphia test-flying Dornier Superwal flying boats

JOHN S KNIGHT H B STEWART, JR. FRED H HARTER and C W FRANK have been named to the board of directors of Air Services Inc Akron, Ohio President GEORGE W MERZ and other officers were re-elected

H GRADY FULLER has been made assistant manager in charge of operations at Drew Field, Tampa Fla, according to a recent announcement by F G HEDRICK, manager.

GEORGE E. MARLATT manager of flying operations for Ford Motor Co at Buffalo, N Y has been transferred to Cleveland where he will occupy the same position. He is succeeded at Buffalo by PAUL G WOODS.

F D BOWMAN has been made general manager of Pioneer Aircraft Co Omaha, Neb J H MCDONOUGH has been made operations managers JOHN KENWOOD, chief pilot, and L E BLAND, chief mechanic.

WILLIAM A STUDEBAKER has been made Midwestern district manager for Western Air Express JOHN O'REILLY succeeds him as Chicago district passenger agent

A J WILSON and DR. C D DICKEY, JR have been elected directors of Los Angeles Metropolitan Airport Other officers and directors were re-elected

A J KNARR, head of the T.A.T.-Maddux weather bureau at Port Columbus, has resigned to return to the U S Weather Bureau at Washington He will be succeeded by C F VANTHUILENAR transferred from the company's weather station at Waynoka, Okla

RALPH WENSINGER has been made pilot for Thompson Aeronautical Corp. on the Ohio division

V H RAMSEY has been made instructor for American Aircraft Corp., Dallas, Tex

JOSEPH TOWLE has been appointed pilot for S.A.T.

R. B NORBY has been appointed manager of the airplane sales and accessories department of Great Northern Aviation Corp, St. Paul, Minn

E E HUSE is president and general manager of Aero-Pacific Corp, recently formed in Los Angeles and appointed distributor of Waco planes in California, Arizona and Nevada Executive offices have been opened in a hangar at United Airport. J. A JARVIS is retail sales manager; R W GRAY is superintendent of service, STANLEY FULMER in charge of parachute sales and service R D LOSE is northern California manager

E E Huse

H HOBART PORTER has been re-elected chairman of the Engineering Foundation OTIS E. HOVEY and G N CLEVENGER were elected vice-chairmen, GANO DUNN and GEORGE L. KNIGHT were named additional members of the executive committee ALFRED D FLINN was re-elected director and secretary FRANK T SISCO, formerly chief of the metallurgical laboratory of the Air Corps at Wright Field, has been appointed editor of a series of monographs on alloy steels.

CAPT. J. D. PARKINSON has been appointed manager of Curtiss-Reid Aircraft Co, Ltd, for western Canada, with headquarters in Winnipeg

V. L. BOLIN, formerly with Universal Air Lines, is now associated with American Airways, Inc, at Wichita, Kan

A W MACREANOR has been appointed Pacific Coast Sales manager for Gliders, Inc. division of Detroit Aircraft Corp

JOHN SQUIRES has resigned as chairman of the board of Kreider-Reisner Aircraft Corp, Hagerstown, Md, division of Fairchild Aviation Corp

GEORGE L. HAYS RUSSELL PEARCE and R. W BUCHANAN recent graduates of Universal Flying School at St Louis, have been made co-pilots on Universal lines

TRADE TIPS

It has been reported that

Bids for installation of eleven revolving beacons steel towers and boundary lights for intermediate fields on the Norfolk-Washington Airway are to be in the hands of the Department of Commerce on or before March 31

Glider Club of Vancouver, B C of which Leonard Miller is secretary, is in the market for a training glider

Plans are being completed for a $30,000 hangar at Meacham Field municipal airport of Fort Worth, Tex. The new hangar is to be 160x78 ft, adjoining the present hangars.

Complete lighting equipment is to be installed at Council Bluffs (Ia.) Municipal Airport this spring under direction of the city Airport Commission.

Glider Club at Hastings, Neb., will buy a glider this spring

East Coast Flying Club, East Coast Aircraft Co Boston, Mass, of which John L. Polando is president, is in the market for a plane

N B Additional information concerning trade possibilities will be found in the column headed "Airport Construction Projects"

Representatives Named

AERONCA (Aeronautical Corp of America)—Mid-City-Issoudun Aviation Corp Darrowville, Ohio, for Ohio, Michigan, and Indiana

IRVING AIR CHUTE—Pittsburgh Aviation Industries Corp, Pittsburgh

KINNER—Pittsburgh Aviation Industries Corp, Pittsburgh

NEW STANDARD—Clevenger and Shoff, operating the Clevenger School of Aeronautics, Mexico City

STINSON—North Atlantic Aviation, Inc, Boston, Mass., distributor for New England

SWITLIK (Floyd Smith Parachutes)—B B Flying Service, Springfield, Mass

VIKING FLYING BOAT CO—Skyways, Inc Boston for New England

WRIGHT AERONAUTICAL CORP.—Rapid Aviation Inc, Omaha, Neb.

New Firms Announced

THE AIRDROME TRANSPORTATION CO, LTD, Los Angeles, Calif capital, 1,000 shares by J Farrant, Frank S Balthis Jr, and others

THE AMERICAN AIRCRAFT CO, LTD, Los Angeles Calif: capital, 20,000 shares, by George Sprado, Merle Kelley, Alfred L Armstrong, L. E. Cavanaugh, Robert Gray, and others

WILLIAMS AIRCRAFT CO, Canton, Ohio capital 1,000 shares no par value stock, by Howard G Williams, Anthony Miller, and Leland F Noble represented by E A McCuskey, 1,200 Harter Bank Bldg, to manufacture and deal in aircraft, aircraft devices and accessories

BRIEFLY

As AVIATION goes to press, word is received that a new altitude record for women has been set by Miss Elinor Smith piloting a Wright-powered Bellanca plane. Pending calibration of her barograph, it is indicated that the new record will be about 30,000 ft.

As shown by the final check-up there were 107,000 paid admissions during the St. Louis International Aircraft Exposition, and gross attendance was 132,000.

Chester Loomis and Ross Hadley, of Pacific Aeromotive Corp., Los Angeles, have returned to this country after an 8,000 mi. tour of Europe in Loomis's plane.

Marvel Crosson glider society has been formed in Los Angeles, with Miss A. Jean Stapf, secretary for the western office of The McGraw-Hill Co., as commandant of squadron one.

Fred Lauden, Boeing factory superintendent, is making a trip through the East and Middle West to inspect production methods in several airplane and engine factories.

Watkins Manufacturing Co., Wichita, Kan., has five low-wing open monoplanes in production.

Goodyear Tire & Rubber Co., Akron, Ohio, has started construction of its 127th non-rigid airship which will be completed and launched this spring. To date the company has also built 903 captive observation balloons, 58 rigid airship gas cells, 105 spherical racing and training balloons, 2,000 advertising balloons, and one semi-rigid airship.

A Lockheed Air Express plane was maneuvered at a height of 25,200 ft. carrying a disposable load of 2,130 lb., in a recent test.

An altitude of 16,000 ft. was reached in a Travel Air biplane with Chevrolair engine in a test by French Lwezy testing the engine for Arthur Chevrolet Co. A height of 8,000 ft. was reached in eight minutes.

The aeronautic committee of California State Chamber of Commerce will appoint a subcommittee to make a thorough study of the glider situation in the state.

According to a recent statement from The Aviation Corp., travel by plane in Alaska is as cheap or cheaper than travel by dog team. Fare from Nome to Fairbanks is $500 for one, or $300 apiece for two or more, while a dog team is said to cost about $500 to $700, taking between 20 and 30 days instead of the 4 hr. 45 min. required by plane.

Col. Paul Henderson, vice-president of N.A.T., spoke on "Operations Problems of Air Transport" before the Detroit section of the Society of Automotive Engineers, March 3.

Research committee of the American Electro Platers Society will hold a conference at the Hotel Powers, Rochester, N. Y., March 22.

Capt. Anton Heinen, who was associated with the building of the Shenandoah for the U. S. Navy, has leased land for an airport at Atlantic City, N. J., and has announced plans for building small dirigible air yachts.

Tests of a barrel type engine developed by Fred Ernest are now being conducted at Los Angeles.

Dr. Hugo Eckener is expected to arrive in Akron, Ohio, this month to confer with Goodyear-Zeppelin officials and to arrange for possible return of the Graf Zeppelin from Brazil via Lakehurst when the proposed flight is made.

Stuart Klingelsmith has been named temporary chairman of the Western Association of Aviation Publicity Agents, permanent formation of which will take place at a meeting to be held in Los Angeles March 18.

AERONAUTICAL CALENDAR

May 27-30	All-New England Air Tour starting from Springfield Airport, Springfield Mass.
June 28	Annual R.A.F. Display, Hendon, Eng.
EXPOSITIONS	
Mar. 6-15	Second Annual Aircraft Show of Aero Club of Pittsburgh, Pa. Ray Krimm, director William Penn Hotel
Mar. 22-29	Second Annual Aviation Exposition Buffalo, N. Y.
Mar. 26-Apr. 1	Cincinnati Aircraft Show, Music Hall, Cincinnati, Ohio, Headquarters, Hotel Sinton
April 5-12	All-American Aircraft Show, Detroit
April 18-26	Tri-State Aircraft Show, Convention Hall, Camden, N. J. L. D. Odheer, executive secretary, Hotel Walt Whitman Annex
April 19-26	Aircraft Exhibition under auspices of Montreal Light Aeroplane Club at The Stadium, Montreal, Canada
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor Dealers Section, Aeronautical Chamber of Commerce, at Madison Square Garden, New York City
July 6	International Transportation Exposition, Warsaw, Poland
MEETINGS AND CONFERENCES	
Mar. 17	Regional Airport Conference for New England, Providence, R. I.
Mar. 27-28	Mid-South Aeronautic Association Convention Auspices Chamber of Commerce, Memphis, Tenn.
Apr. 8-9	Meeting of Society of Automotive Engineers, Detroit, Mich.
May 5	A.S.M.E. conference on economy of maintenance and operation, New York, N. Y.
May 14-16	National Conference, Airport Section, Aeronautical Chamber of Commerce Buffalo, N. Y.
May 26	Fourth Annual Technical Aeronautical Meeting, A.S.M.E., Wright Field Dayton, Ohio
July 3-5	Western States Aeronautical Conference, Medford, Ore.
AIRPORT DEDICATIONS	
April 19	New Bedford-Fairhaven Airport dedication and meet, New Bedford, Mass.
May 27	Turners Falls-Greenfield, Mass.
May 30-June 1	Dedication and Air Meet, Bowles Airport, Springfield, Mass.

Schools and Colleges

BOEING SCHOOL OF AERONAUTICS, Oakland, Calif., announces that new classes in the master pilot and master mechanic courses will begin April 7, July 1 and Sept. 22, and will be limited to 40 students each. Instruction in the master mechanic course has been increased from 1,008 to 1,224 hr. and the master pilot, from 864 to 924 hr., but there has been no increase in tuition rates. Students from 22 states are now enrolled in the school.

CURTISS-WRIGHT FLYING SERVICE SCHOOL, Kansas City, Kan., has started a course in night flying for students in the transport course. Instruction in blind flying is also given.

MASSACHUSETTS STATE DEPARTMENT OF EDUCATION, University Extension Department, announces a course in popular aviation to begin March 20 and to be held in the Massachusetts Normal Art School building, Boston. The course consists of eight weekly lectures on the fundamentals of airplane construction and operation by Robert O'Brien, state supervisor of aviation.

MERIDEN AIRCRAFT CORP. and the Y.M.C.A., Meriden, Conn., which jointly conduct a ground school at the municipal airport, have recently opened a new classroom building.

NEKOOSA SCHOOL OF FLYING, Wisconsin Rapids, Wis., which has been operating a winter base at St. Petersburg, Fla., will return to Wisconsin Rapids for its summer activities on April 1.

PARKS AIR COLLEGE, East St. Louis, Ill., announces a special summer flying course for university and college students to be held June 15-Sept. 1. The course, which leads to qualification for a private pilot's license, will include 28 hr. of flying and ten weeks of transport pilot's ground training.

UTICA FLYING SERVICE, Utica, N. Y., has received a cutaway Wright Whirlwind for display and instruction in its ground school course at Utica Free Academy.

WRIGHT AND HUTCHINSON SCHOOL OF FLYING has been organized recently and operates at the Mobile (Ala.) Airport.

Ford Plane Ambulance for Army

WASHINGTON (D. C.)—Called the largest flying ambulance in existence, a tri-engined Ford craft, outfitted to carry from four to six patients, a flight surgeon and a medical attendant, and a crew of two, will enter the Army service at the annual Field Exercises for Air Corps, Sacramento, Calif., which will take place April 1-24. Radio and medical equipment will be carried, and so as to give the plane right of way while in the air and in landing, a red cross imposed upon a white circle will appear on each side of the machine under the fuselage, and on the wing tips. Lieut.-Col. L. M. Hathaway, Chief Flight Surgeon of the Army Air Corps, in citing the value of the new craft stated that last year Army planes transported 23 patients over a distance of approximately 4,000 mi. in about 53 hr.

AIRPORTS AND AIRLINES

New York Draws Up Air Regulations

NEW YORK (N. Y.)—A set of regulations for air traffic over this city has been drawn up by the Police Department as a result of recent crashes. Among other stipulations the proposed code would require: minimum altitude while over the city of 4,000 ft.; discontinuance of plane advertising, including use of smoke, lights, noise-making instruments, etc.; elimination of flying near an open air assembly; licensing of all airports within the city limits by the Police Department; registration of aircraft operated from such airports, and registration of all pilots operating from such airports.

It is provided, further, that:

1. It is therefore desirable that the aviator and the owner of the plane shall be made absolutely liable for any damage which may result to person or property whether caused by the negligence of the aviator or due to any avoidable accident. Similar provisions enforcing the doctrine of absolute liability are in effect in other states and the law of the State of New York should be so amended as to provide this same liability.

2. Where a person has been injured or killed as a result of a violation of any of the provisions of the proposed Municipal Legislation the person responsible therefor should be guilty of a felony. This would also require an amendment to the Penal Law of the State of New York so as to provide a proper punishment for those persons violating the regulatory measures enacted by the City of New York where injury or death is caused to any person.

Boeing Reports Radio Progress

OAKLAND (CALIF.)—Successful tests with a radiophone transmitter over 380 mi. have been reported by the Communication Department of Boeing Air Transport which is completing a two-way voice communication service between plane and ground stations on the San Francisco-Chicago and Los Angeles-Seattle routes. The test was made between the Oakland and Los Angeles, the voice coming in with sufficient strength to use the loud speaker. Boeing officials reported that in another test a pilot, while over Redding, Calif., was heard distinctly at Sacramento, a distance of approximately 110 mi., and that in recent weeks pilots have talked from altitudes as great as 12,000-14,000 ft. to ground stations more distant than 200 mi.

Concord Port Makes Profit

CONCORD (N. H.)—A small net profit for 1929 was reported by the directors of the Concord Airport Corp. at their annual meeting here recently. Gross income amounted to more than $5,000, the principal items being $3,500 received for gasoline and oil sales and $1,300 for hangar rentals. Traffic at the airport increased considerably over 1928.

Detroit to Have Hanson Beacon

DETROIT (MICH.) — The electromagnetic blind flying device invented by Earl C. Hanson which for approximately two years has been in experimental operation at Ford Airport, Lansing, Ill., will probably be installed at Ford Airport, Dearborn, within a short time, according to a recent announcement here. The Hanson system, if installed, will supplement the directional radio beacon system now on the airport. [See AVIATION for Feb. 22—Ed.]

New Mail Service Links Canadian Cities

WINNIPEG (MAN.)—The Prairie air mail service between this city and Calgary, Alta., was opened March 3. This 750-mi. line, operated at night, includes stops at Regina, Sask., Moose Jaw, Sask., and Medicine Hat, Alta. Through air connections at this city from the East, a transcontinental air mail service as far west as Calgary is thus provided and it is hoped the last section between Calgary and Vancouver will be constructed next year. Edmonton, Alta., is connected with this line by a day service to Regina over a 450-mi. airway.

The west bound mail plane leaves this city daily at 9 p.m. Central Time and arrives at Calgary at 5 a.m. Mountain Time. The eastbound plane leaves Calgary at 2:15 a.m. and reaches this city at 12:15 p.m. The plane for Edmonton from Regina leaves at 8 a.m. and arrives at 1:30 p.m. The southbound plane on this line leaves Edmonton at 12:15 p.m. and reaches Regina at 6 p.m. Western Canada Airways, Ltd., is the operator of this service under contract with the Canadian government.

Central Sued for Fatal Crash

KANSAS CITY (KAN.)—A damage suit involving the responsibility of passenger air lines as common carriers was filed in the Wyandotte County district court here Feb. 24, asking $10,000 damages for F. A. McKinnon, 9-yr.-old son of C. Roy McKinnon of Chicago, one of the four passengers killed when the Central Air Lines plane crashed at Fairfax Jan. 27. The action is based on a legal doctrine that obviates the necessity of pleading a specific instance of negligence. Under it the plaintiff would need only to prove the relationship between McKinnon and his son, that McKinnon paid his fare on the plane, that he was accepted as a passenger and that there was an accident in which McKinnon was killed. It then would become incumbent on the defendants to prove there was no negligence in the crash.

Visual Type Radio Beacon at Detroit Port

DETROIT (MICH.)—The second of the vibrating reed visual type radio range beacons developed by the Airways Division, department of Commerce, has been installed on Wayne County's new mile-square airport. Successful preliminary tests have been made, and the Department's engineers are now awaiting arrival of an experimental radio plane from Washington. The first of this type beacon—a type transmitting beams in twelve different directions—was installed about 6 months ago at College Park, Md. It is planned to build six other beacons similar to these so that they may be tested by the nation's air transport operators.

The Wayne County beacon was installed by W. E. Jackson, Department of Commerce radio engineer; S. L. Bailey, associate engineer, of the Eleventh Lighthouse District, and Charles A. Park, of Detroit, superintendent of the Eleventh District. The poly-directional beams were tested by the usual reed boxes installed on a truck which circled the airport.

Special Equipment Needed

The vibrating reed system is the Department's latest answer to the long search for a more satisfactory device to replace the somewhat awkward aural system. Ordinarily the ground equipment consists of an especially developed transmitter, a goniometer, a generating unit, and two large loops set at right angles to one another. However, due to the importance of maintaining practically constant frequency, the Wayne County range has been equipped with a Leeds and Northrup frequency controller, an inverted rotary convertor and other additional devices costing about $1,000.

In operation the range sends out beams in twelve directions normally spaced at 30 deg., although the beams can be adjusted or "bent" to from 5 deg. to 45 deg. Each beam has a width of 1½ deg., plus or minus, and a length of from 80 to 100 mi., giving each such station an airway coverage of approximately 1,200 miles.

"Our transmitter," Mr. Jackson said, "is quite unusual. It consists of a master oscillator tube which excites three radio frequency channels through a phase splitting device, which, in turn, adjusts the radio frequency phases applied to each channel to 120 deg. time phase displacement. Each radio frequency channel is modulated at a separate audio frequency, the audio frequencies used being 65 c., 86.7 c. and 108.3 c. The outputs of each of these channels are applied to the goniometer stators in

(Concluded on Page 548)

AIRPORT CONSTRUCTION PROJECTS

South

FUNDS FOR FINANCING extensive improvements on the Jacksonville Municipal Airport were made available recently by the sale of a block of airport bonds amounting to $23,000. They represent the last of an issue voted for the airport some time ago. The Atlanta National Bank purchased the bonds. About $18,000 will be spent at once for new equipment.

Recommendations include installation of a radio receiving set and loud speaker; first aid equipment; fire fighting apparatus; sleeping quarters for three persons; removal of the present administration building to a more central location; extension of present landing strips; construction of a northwest-southeast diagonal runway 500 ft. wide and 2,500 ft. long; cone markers; additional boundary lights; floodlights on hangars; flood lighting and roof marking ceiling projector; construction of oil house and extension of brick apron before hangars. Oiling of present cinder runways was suggested as an experimental measure.

Construction has been started on the bayfront airport at Dunedin Isles, Fla., by the Florida Aircraft Corp. A steel hangar with space for five planes is available for immediate use, and two runways are being put in. One runway from northeast to southeast is 1,200 ft. long, the other northeast to southwest is 900 ft. long. A machine shop and a gas and oil supply station will be operated.

The Tampa (Fla.) airport committee has asked B. Russell Shaw, airport engineer and designer, to submit a design for the new airport at a flat fee of $24,000. The board also authorized the issuance of the $750,000 airport bonds voted last November.

Tampa, Fla., is reported negotiating for Drew Field to be used as part of $750,000 aeronautical development program.

Georgetown, Tex., has voted airport bonds to amount of $11,500.

Central

Cedar Rapids (Ia.) City Council has announced that the proposal for an annual levy not to exceed 8 mills will be submitted at the city election March 31 to provide funds for a municipally owned airport. This special tax levy was rejected at a special election last September. The new proposal will provide for a fund to acquire, equip and maintain an airport at a cost not to exceed $175,000.

The Cleveland City Council is expected to approve use of $8,000 of airport funds for the leveling of a temporary landing field on the lakefront, 5 min. from the business district. Council will also move to obtain an early solution for the legal problems that stand in the way of development of a permanent waterfront passenger air terminal for use of landplanes, seaplanes and amphibions.

Expansion and improvement of the Aurora (Ill.) Airport in an effort to make it an emergency terminal for the transcontinental air lines operating through Chicago may be expected in the near future.

A new revolving beacon to replace the one of obsolete type now in use has been received at the Omaha, Neb., municipal airport. Special cams are being made to enable the beacon to flash the signal "OM."

A special election will be held May 6 at Omaha on the proposal to issue immediately $200,000 airport bonds instead of issuing the bonds at the rate of $50,000 a year.

A 60-acre tract, adjoining Perry, Ia., has been donated to the Perry Community Club for airport purposes by J. C. Byron, president of the Perry State Bank.

The municipal airport at Norton, Kan., was placed in service the latter part of February. A 40x40 ft. hangar is being installed.

Boeing is installing a $5,000 two-way radio-telephone communication station at its Cedar Rapids (Ia.) field.

National Airways System, of Peoria, Ill., will build a $25,000 airport at Decatur, Ala., it is reported.

Hastings, Neb., has voted to purchase 160 acres of land costing $28,000 for a municipal airport.

East

The Baltimore Airport, Inc., Hanover & York Streets, Baltimore, soon will start construction of its airport at junction of Rolling Road and Windsor Mill Road, near Woodlawn, Baltimore. Terminal buildings, hangars and two runways about 2,500 ft. long, are included in the work.

A complete lighting system, comprising flood and marker lights, has been installed at Seymour Field, Little Falls, N. Y., and will be ready for use early in the spring.

A large hangar, fully equipped for repairs of all kinds, has been completed at the Moncton (N. B.) Airport. The field is lighted for night flying and thirteen men are employed at the port.

Twenty-two additional acres have been secured by the Beverly Aero Club, bringing the total area of the Beverly (Mass.) Airport to 65 acres.

North Central

Lockers and special accommodations for eighteen women fliers are to be provided in the new Curtiss Airport hangar nearing completion outside Milwaukee. The $80,000 structure will also house twenty planes, accommodations for men pilots, machine shops, class rooms for students and a waiting room for passengers.

The Glenwood, Minn., Flying Club has sponsored the development of an airport serving that city. The field includes 150 acres and has several runways 2,000 ft. long and 300 ft. wide.

Owners of a 240-acre tract which it is proposed to add to the municipal airport at Minneapolis are protesting plans for condemnation proceedings and threaten appeal to a district court.

Kaslo, B. C., has begun preliminary steps towards the construction of a municipal airport.

West

Bids on construction of the approach to Portland (Ore.) Municipal Airport, to cost approximately $222,000, were to be opened March 10 by the Portland City Council. The new roadway will provide a separate-grade viaduct to the landing field.

Oakland Municipal Airport is to have a $75,000 aeronautical laboratory. The new building, measuring 90x150 ft., is to be erected adjacent to the Boeing School of Aviation and will serve as a laboratory for the school.

The contract has been awarded for construction of additions to hangars No. 2, 3 and 4, at the San Francisco Municipal Airport at a cost of $34,200. Spivock & Spivock, Hobart Building, were the successful bidders.

George Smee, city manager of Ponca City, Okla., has awarded the contract for erection of hangar and administration building to cost about $40,000 to Atlas Construction Co., Tulsa.

Seminole, Okla., has voted airport improvement bonds amounting to $30,000. This is a second vote, to validate bonds voted at a previous election but not issued.

Blackwell, Okla., has voted airport bonds to the amount of $25,000 and is having plans prepared for 80x100 ft. hangar, to cost about $16,000.

Los Angeles has taken out a building permit for erection of a 120x140 ft. stone tile hangar at the Municipal Airport, to cost $30,000.

N. Y. Port Conference Held

ELMIRA (N. Y.)—The first New York State Airport conference under the auspices of the Aeronautical Chamber of Commerce was held here March 5. The all day program included addresses and discussion periods on the following subjects: Flying Schools and Airports, by Maj. George A. Vaughn, president of Eastern Aeronautical Corp., Newark; Airport Lighting, by A. J. LaBaie, of the Airway Division, Aeronautics Branch; Aviation Insurance, by L. J. Nelson, of the U. S. Aviation Underwriters Corp.; Airport Selection and Construction, by A. A. Bigelow, of Black & Bigelow; and Airport Revenue, by Charles H. Gale, assistant editor of AVIATION. Other speakers included S. Griswold Webb, chairman of the State Aviation Commission and Arthur G. Beggs, New York representative of Western Air Express. Major Vaughn was general chairman and Sherman P. Voorhees was chairman of the arrangements committee.

Testing New Cone at St. Louis

ST. LOUIS, (MO.)—An illuminated wind indicator mounted on a 40-ft. steel tower is being tested at Lambert St. Louis Field. The cone, which resembles a miniature dirigible, is 18 ft. long and 3 ft. in diameter.

Buffalo Anticipates More Airline Traffic

BUFFALO (N. Y.)—Extensive development of passenger lines out of Buffalo is under way on the part of three companies and with the opening of the summer tourist season several important air transport lines will be in operation. Stout D&C Air Lines, Inc., whose proposed passenger service between Buffalo, Cleveland and Detroit failed to get under way last fall, promises to inaugurate its line early in May using Dornier Super-Wals, according to present plans.

Two round trips will be made daily between Buffalo and Detroit via Cleveland. The Buffalo terminal will be at the municipal seaplane base on the waterfront. The Cleveland terminal probably will be at the East Ninth Street pier and at Detroit the planes will land in the Detroit river near Belle Isle and taxi to the Third Street wharf of the Detroit & Cleveland Navigation Co.

Colonial Western Airways will operate Sikorsky amphibions between Buffalo and Toronto across Lake Ontario via Niagara Falls on a 45-min. schedule with two round trips daily. Plans also are being made by the company for through passenger service between Albany and Cleveland via Buffalo. Skyview Lines, Inc., a subsidiary of Stout-D&C Air Lines, will operate a taxi service from Buffalo to Niagara Falls and also a local sight-seeing service over the falls from the Niagara Falls and Chippewa airports, using Ford transports.

Name Tennessee Board Members

NASHVILLE (TENN.)—L. W. Hughes and J. W. Canada, of Memphis, Tenn., are the first two members to be appointed on the newly created aeronautics commission. This commission was created by the state legislature to aid and encourage the development of aviation in Tennessee.

Boeing Using Transports

OAKLAND (CALIF.)—Boeing System has begun operation of tri-engined transports between San Francisco and Omaha carrying mail and will extend these flights soon to Chicago preparatory to inauguration of its expanded passenger service.

Airways Division Orders Lights

WASHINGTON (D. C.)—Contract for 400 standard 18-in. red and green course lights has been placed with Westinghouse Electric & Manufacturing Co. by the Airways Division of the Aeronautics Branch. They will be made in South Bend, Ind., at a unit price of $60.42, making the total about $24,168. The contract calls for delivery of 50 units in 90 days and 50 units per week thereafter. Red lights will be installed where there are no intermediate landing fields; green lights will mark the intermediate fields.

Traffic Heavy On Air Ferries

SAN FRANCISCO (CALIF.)—During February, the first month of its operation, Air Ferries, Ltd., carried more than 10,000 passengers, the company reports. Three Loening amphibions used were flown 10,000 mi. and the bay crossing was made 1,500 times. It is planned to extend the ferry service to Stockton in the interior and put in operation about 22 additional planes. The service was launched Feb. 1. Planes are operated at 10-min. intervals to Oakland.

Northwest Has New Mail

MINNEAPOLIS (MINN.) — Northwest Airways, Inc., was granted permission by the Post Office Department to operate mail service between the Twin Cities and Rochester, Minn., beginning March 8.

St. Louis Adopts Port Improvement Plan

ST. LOUIS (MO.)—A three-year program of runway construction and drainage work at the St. Louis Municipal Airport involving an expenditure of $385,000 has been decided upon by the city airport commission. The plan calls for laying four runways and several taxi strips with the incidental drainage necessary. Under the adopted program about $211,000 will be spent this year. Two 2,800-ft. runways and portions of a taxi strip will be completed at a cost of $122,000 while $89,000 will be spent on drainage. The existing 1,500-ft. asphalt north-south runway will be extended another 1,300 ft.

Next year $100,000 will be spent. Of this sum $58,000 will go for an east and west runway which will approximately parallel an experimental runway of 1,400 ft. now being used. During the third year $74,000 will be spent, of which $47,000 will go for a runway and $27,000 for drainage. Plans for this project were drawn by B. Russell Shaw Co. and in their original form a scheme for parallel runways was presented.

New Radio Generator Developed

STAMFORD (CONN.) — Electric Specialty Co., of this city, has developed a three commutator wind-driven generator in connection with a storage battery for use in supplying current to airplane radio apparatus while the aircraft is at rest as well as while in the air. Bell Telephone Laboratories will test these generators in actual installations. [A further description of this device will be printed in an early issue.—Ed.]
Commerce

Adams Pick-Up Tested at Capitol

WASHINGTON (D. C.)—More than 1,200 tests of the Adams air mail pick-up device recently were flown for the observation of the Post Office Department at Hoover Field, Washington. At the request of government officials 25 tests were made of pick-up alone, 25 of delivery, and 100 of simultaneous pick-up and delivery. Bags weighing variously from 5 to 150 lb. were used in the tests. The practicability of the device is attested by the fact that of 230 attempts, flown in high wind, and in rain, only five were unsuccessful. These failures were due to the mail bag being blown off its course as it approached the trap.

The trap consists of a funnel-like box with an open mouth 30 ft. wide and 15 ft. high, resting on a circular track by which it may be headed into the wind. A sheet-iron chute, with a narrowing slot in the roof, tapers back 40 ft. from the mouth to a round channel the muzzle of which projects beyond the apex of the funnel. Below this channel mouth, at the end of a beam equipped with two powerful coil springs, rests a cradle like a ducking stool, in which is placed the departing mail sack or sacks. To these pouches is affixed a 10 ft. steel cable attached to a slotted cylindrical metal cup whose open end fits into the mouth of the channel. The cradle and beam are drawn back onto the compressed springs to catapult the load.

Pick-Up Sequence Explained

The pick-up plane is equipped with a simple automatic reel, from which is suspended through a trap door in the cabin floor an ⅛-in. steel cable extending 100 ft. to a 3 in. metal ball. Inside the plane the mail sacks or other load to be delivered into the trap are attached to this ball by a short break-wire. The reel unwinds the cable and drops ball and pouch down as far as desired, while the pilot flys over the funnel so that they swing into its wide mouth, where the slot steers the cable so that the load is drawn to the circular hole at the apex. There the break wire releases the pouch onto the floor of the funnel.

Continuing through the channel the metal ball touches a trigger which releases the catapult and enters the cup to which is attached the departing load. The catapult throws the new load upward and outward in the direction of flight a split-second before the hoisting cable straightens out.

Pick-ups and deliveries were made by Trowbridge Sebree, flying a New Standard at 80 m.p.h. Assistant Postmaster General W. Irving Glover and Assistant Secretary of Commerce Clarence M. Young commended Dr. Adams on his invention. Should the Post Office Department approve the invention for installation by air mail operators, the Truscon Steel Company is prepared for immediate production. Under the present plans of the Adams Air Express, Inc., the pick-up device would be leased to operators or townships at a yearly rental of $1,000, following an installation charge of $4,000.

Airway Briefs

Airport regulations recommended by the Aeronautics Branch have been adopted at Tampa Municipal Airport. Operation of the field has been placed in the hands of the department of public works.

A series of four lectures on airport problems is being given at Harvard University Engineering School by Stedman S Hanks.

Performance figures for the Boeing tri-engined, eighteen-passenger transport plane are as follows: take off run, 750 ft; climb 850 ft per min; service ceiling, 14,000 ft; high speed, 138 m.p.h; cruising radius, 5½ hr. at 115 m.p.h.

A 30,000,000 cp. beacon which had been mounted on the Union Trust Co. Building, Cleveland, Ohio, has been presented by the company to the Cleveland Municipal Airport.

Western Air Express is constructing a map for installation in the Los Angeles office which will indicate electrically the exact position of all company planes in service at any time.

Use of a common landing field midway between the two cities for air mail service to Dallas and Fort Worth, is recommended in a report submitted recently by E R Brown, chairman of the aviation committee of the Dallas Chamber of Commerce. Designation of the Curtiss-Wright field at Dalworth for this purpose is being considered.

The Army hangar at Little Rock is being dismantled for shipment to Hensley Field Dallas. The City of Dallas appropriated $6 000 to cover the cost of transfer. In return, the city will have use of two Army hangars at Love Field.

General Electric Co. is offering a central control panel for use in airport lighting which shows by means of indicating bulbs exactly what lights are on at any given time.

Robert Hopkins, N.A.T. pilot, has been awarded the Chicago Daily News trophy for a successful landing in Edgewater Park, Cleveland, on a night when he was unable to locate the airport because of fog.

Common council of Utica, N. Y., has turned down a proposed bond issue which would include $35 000 for improvement of the municipal airport. A branch of the Syracuse weather reporting station is to be established there, as well as at Phelps, N. Y.

An 8,000,000 cp. beacon has been installed at Maitland Field, Milwaukee.

A propeller pitch setting stand manufactured by New Hampshire Aviation & Marine Co, has been installed at the Cleveland repair shop operated by Thompson Aeronautical Corp.

Teletype weather reporting service is to be installed at Akron Municipal airport before July 1.

Bay State Flying Service has been evicted from Boston Municipal Airport. It is charged that the company had no lease for the land occupied by its building, and did not pay rent.

Carrier Engineering Corp., through Art Alliance of America, 65 E 56th St., New York City, is offering $800 in prizes for a design for weather vane and fixed neon light beacon to be installed at its Frelinghuysen (N. J.) plant.

Completion of lighting installation between Atlanta and Chattanooga, part of the route operated by Inter-state Airlines, is expected this month according to a recent announcement from the Department of Commerce.

City Council of Vancouver, B. C., is making efforts to persuade the Canadian government to include establishment of an air mail line across the Rocky Mountains in the budget estimates for next year.

Departure of T.A.T.-Maddux planes from Wichita for St. Louis is now at 2:30 p.m. instead of 2:50 p.m. During February, 300 passengers embarked on company planes at Wichita.

Under an amendment to its Incorporation Act, Vancouver, B. C. will be empowered to lease its airport or any part of it to private interests.

A bulletin entitled "Summer Sea Fogs of the Central California Coast" by H. R. Byers has recently been published by University of California.

Beeler Blevins hangar at Candler Field Atlanta with about fifteen planes, was destroyed by fire March 4. Damage was estimated at $140,000.

Stout Air Services has taken over the Gray Goose hangar at Chicago Municipal Airport and will use it for repair and storage purposes. The company has also acquired the Austin hangar at Cleveland municipal airport.

Two experiments in which attempts were made to pick up mail in a blimp from a moving train were reported as unsuccessful by officials at Lakehurst N. J.

A 24-in. red revolving beacon has been placed on top of one of the RCA radio masts at Franklin N. J., which is near Hadley Field and lies in the general path of the New York-Atlanta airway.

Stout carried 750 passengers in and out of Cleveland airport in February, and Universal carried 470.

Competitive examinations for airport positions in Milwaukee are now being drafted by the county civil service commission and are expected to be given about March 24.

Prizes totalling $1,000 were offered for various contests and races in connection with the dedication of the Vero Beach (Fla.) airport March 3-4. The 140-acre port has been named Vero Beach Silvertown Field.

D. W. Tomlinson, vice-president of T.A.T. Maddux is making an inspection tour of the eastern division.

Visual Type Radio

(Continued from Page 545)

the proper time and space phase relationship.'

The tips of the reeds are white against a dark background so that when vibrating they appear as vertical white lines. For use in night flying suitable indirect lighting of the reed tips is provided. When the two white lines are equal in length the airplane is on its course, a deviation from this course increases the deflection of one reed and decreases that of the other. The sensitive reed indicator requires less than 4 volts across the indicator terminals for normal reed deflections.

The principal difference between the equipment of the four-course range and the newer type is that three amplifier branches are modulated to three different frequencies instead of two. The coil antenna system and circuit arrangements are the same as are the two basic frequency cycles of 65 and 86.7. A third basic modulation frequency of 108.3c. is added, however.

Any plane equipped with a two-reed indicator, whose reeds are tuned to any two of the three frequencies employed by any twelve-course range can utilize the beams to which his reed box is attuned. Both the two- and three-reed indicators are of similar size and are interchangeable. The few such indicators now in existence have been made by the Pioneer Instrument Co. and Julius P. Frieze.

The two loops above the Wayne County Airport range are each 212 ft long and 50 ft high. The station can operate on any frequency between 285 and 350 kc. Erection of the station, which covers approximately 2 acres of the 640-acre airport, and installation of the equipment has been in progress for nearly a year. Much of the development work was done at the Eleventh Lighthouse District headquarters.

Issue Booklet on Port Drainage

MIDDLETOWN (OHIO) — Airport drainage problems are analyzed in booklet C-2 recently issued by Armco Culvert Mfrs. Association. Following a general discussion of the problems in different localities, with different types of soils, with and without surfaced runways, six tables are given from which the proper drainage facilities needed at any specific airport can be calculated. These cover surface runoff, recommended depth and spacing for subdrains, load factors and physical test requirements for drain tile.

Road Engineers Discuss Ports

ANN ARBOR (MICH.)—The development of airports presents the most pressing problem before the nation's highway engineers according to speakers at the sixteenth annual conference on highway engineers held here recently. Aeronautical speakers on the conference program included John E. Sommers, airport specialist Department of Commerce.

FOREIGN ACTIVITIES

Guinea Airways Has An Interesting Career

LONDON (ENGLAND)—Guinea Airways, Ltd., operating in New Guinea reports net profit of $44,360 during the 6 mo. ended Aug 31, 1929, as compared with a net profit of $22, 130 for the preceding 6 mo. period. The company has three multi-engine Junkers all-metal freight planes and has ordered a fourth. A metal Gipsy Moth is used also. The volume of traffic in both cargo and passengers during the several years of the company's operations has increased steadily.

Guinea Airways will be called upon next year to handle the transportation of a hydro-electric plant and two 10 cu.ft. gold dredges from the seacoast to properties to be developed by the Placer Development Co. It has been decided to use aircraft in lieu of ground means of transportation because it would cost about $1 250 000 to build a road through the jungle and would delay considerably the inauguration of operations. By air the trip is only 30 min. from coast points to the mining site and start of operations will be advanced about 1½ yr.

It will cost about $500 000 to build the two special freight planes for the service and operate them over the route, it is estimated. The planes will carry dissembled parts of the dredges and power plant at the rate of 200 tons per month. The freight load of each plane will be limited to 3½ tons. Special designs in the plane will provide a cargo compartment 24 ft. long and a hatch for the loading of the place measuring 12½x5 ft. The heaviest single piece of freight will be the dredge tumbler shaft which will measure 12 ft by 18 in. and will weigh 6 900 lb.

The total weight of all parts is about 2 400 tons. The power plant is scheduled for completion by October, 1931, and the first dredge is to be in operation by the close of that year. Tri-engined all-metal planes are to be used.

Approve Light Plane Records

PARIS (FRANCE)—The F. A. I. has just approved the following records for Class C, light two-seaters first category (machines weighing less than 881 lb empty). Distance on a closed circuit 2 746.2 km. (about 1,701 mi.). Renato Donati and M. Capannini (Italy) on Fiat A.S. 1 monoplane, 85 hp. Fiat A.50 engine, at Montecelio, Jan. 19-20 1930. A duration record, for same category, of 29 hr. 04 min., was established by the same crew at that time also. The duration record for the different categories of light planes, hitherto not officially recognized, are recorded now by the F.A.I. as of Jan. 1, 1930.

Costes Adds Two More Records

PARIS (FRANCE)—MM. Costes and Codos, using their special Breguet sesquiplane with 600 hp. Hispano-Suiza engine established Feb. 15-16 the world distance and duration records for land planes carrying 1,000 kg. load. Starting from Istres field, with 696 gal of fuel, they took off in 880 yd. and flew to Nimes to begin circling their usual Nimes-Narbonne Course. The weather early in the night was quite favorable, but rain and wind interfered afterwards slowing the machine considerably and compelling the airmen to use the Nimes-Istres emergency circuit. They missed the speed record for 2 000 km. by the narrow margin of 7.37 m.p.h. but succeeded in improving by a comfortable margin upon the previous distance and duration records. Their marks were 2,060 mi. as compared with 1,439 mi. and 18 hr. 01 min. as compared with 14 hr. 23 min.

Germany-Ireland Mail Line Planned

LONDON (ENGLAND)—A mail and passenger service is to be inaugurated by Luft Hansa soon between Hamburg and Galway, Ireland, it has been announced in reliable quarters. The airport at Hull will be an intermediate field and a British Customs Office. This service is expected to speed up certain trans-Atlantic mails which will be landed at Galway for transportation to Germany by air. It will be recalled that the North German Lloyd Line experimented with such a service late last year, the test flights being considered quite successful.

The length of the stages in the proposed route are approximately: Galway, across Ireland, 120 mi.; Irish Channel 60 mi.; Britain, from the west to Hull, 200 mi.; North Sea to Hamburg about 390 mi. Two hundred miles of the North Sea journey will be over open sea and the remaining 190 mi. in sight of European coasts.

It is understood that the Junkers tri-engined land machine will be used. This is a type which has also been adapted for floats, and it is possible, therefore that in view of the long North Sea passage it may be found expedient to transfer to these craft for the sea section of the route. Britain at present is scarcely in a position to compete with German enterprise on this route. Imperial Airways, by agreement with the Air Ministry, has exclusive right to any subsidies granted in respect of airlines between Britain and the Continent but even if these two groups desired to open a North Sea route they would be prevented for sometime by lack of suitable aircraft.

Rules Announced For Light Plane Tour

BERLIN (GERMANY)—The Aero Club of Germany has announced the regulations of this year's European Light Plane tour, of which it is the organizer since a German plane won the 1929 competition. The regulations have been considerably revised and improved. While Italy and Roumania will not take part this year, three other nations that refrained from participation last year have already entered. The entries so far include Great Britain, France, Spain, Poland, Czechoslovakia, Switzerland and Germany. [See AVIATION for Feb. 15 for the route.—Ed.]

One of the greatest changes made from last year's rules will be that speed will not be rated so high since the competition is designed rather to develop greater reliability and comfort than high speed. For this reason the weight limits have been increased also. There will again be two classes of planes according to their empty weight. The smaller class will have a maximum weight limit of 617 lb. and 881 lb. The respective maximum speeds will be 96 m.p.h. and 109 m.p.h. for which, however, less points are to be awarded than in the previous year. The higher the speed of a plane, the less proportionately will be the number of marks awarded. An increase of weight over the figures given, of 15 per cent will be allowed so that the actual permissible empty weights of the participating machines will be 705 lb. and 1 014 lb.

Technical Tests Follow Tour

The flight is to start on July 20 and finish on July 31. The technical efficiency test will be held after the flight instead of before as in the previous year. Only machines completing the flight will be eligible. These tests are to be made on the Staaken airport Aug. 1-7 and will be directed principally to establishing the practical value of a machine. Emphasis will be attached to comfort, instrument equipment, ease of assembly and disassembly, fireproofing, running gear, starter appliances, etc. This year the machines must make a short trial flight after the assembly competition, a feature which was omitted last year and considered a grave mistake. A fuel consumption test will be conducted, the machines having to fly over a circuit of approximately 2 mi. Oil consumption will not be rated as this is of wholly minor importance to flying costs.

A take-off and landing test will be held for the first time. The machines will be drawn up a certain distance before an obstacle 26 ft. high and consisting of two masts with a line carrying

(Concluded on Page 550)

Australian Aviation Is Voted More Funds

MELBOURNE (AUSTRALIA) — The sum of almost $100,000 has been voted for the Australian Civil Aviation Branch pay as compared to about $56,000 last year. The following salaries have been announced for the various officers: Comptroller of Civil Aviation, $6,000; Deputy Comptroller, $3,575; Superintendent of Civil Flying Operations, $3,120; Superintendent of Aircraft, $3,150; Superintendent of Aerodromes, $3,480; District Superintendent, $2,850; Senior Aircraft Inspector, $2,530; Senior Aerodrome Inspector, $2,440; Aircraft Inspector, $2,310; Draftsman $2,275. There are 23 employees in the Civil Aviation Branch.

About $530,000 has been voted for all of the operations of the Civil Aviation Branch, including the pay mentioned above. About $375,000 of this has been allotted to the general development of civil aviation. A year ago the entire appropriation was about $380,000, with $254,000 allotted to the development of civil aviation.

Aviators League Gives Trophies

PARIS (FRANCE)—Award of the 1929 trophy of the International League of Aviators was made to Capt. Dieudonne Costes at a meeting March 9. He also receives the Grand Medal of Honor, diploma, and a prize of about $392. National trophies were awarded as follows: Belgium, Jacques Maus; England, Capt. C. D. Bernard; Germany, Baron Koenig von Warthausen; South America, Commandant Tadeo Larre-Borges; Spain, Capt. Ignacio Jiminez; United States, Lieut. James H. Doolittle. Grand medals of honor were voted to Rear Admiral Richard E. Byrd and Bernt Balchen, for the United States, and to Capt. Leon Challe, for France.

Australian Line Opened

MELBOURNE (AUSTRALIA) — Australian National Airways, Ltd., Sydney, began service between that city and Brisbane Jan. 1. Flying equipment consists of four British-built Avro-10 transports, the English version of the Fokker F-7, manufactured under license. The machine accommodates eight passengers and two pilots, and is powered with three 230 hp. Armstrong-Siddeley Lynx engines. The pilots include Capt. T. E. Kingsford-Smith and Capt. C. T. P. Ulm.

Tour Rules Announced

(Continued from Page 549)

flags, between them. The machines must cross this when starting and land over it within a specified distance from the obstruction. A climbing test will not be included this year since the machines will have to climb over the Pyrenees mountain range between France and Spain.

Foreign Briefs

Fare between London and Paris via Imperial Airways will be reduced from $24 to $21 soon, making it lower than it has been before since the service was started.

Attempts to improve records for planes carrying loads will be made with the new Latecoere 28 monoplane, fitted with 600 hp. Hispano-Suiza engine.

Avions Potez has introduced a new high-wing semi-cantilever commercial monoplane with 500 hp. Hispano-Suiza engine.

The Farman company is planning a light plane of about 60 hp. to compete in the International Tour this summer.

Avions S.E.C.M. is completing a multi-engined, heavily armored all-metal fighting plane.

Colonel Vuillemin, accompanied by his wife and son, has completed a 6,200 mi. African tour in a Caudron 117 monoplane with 60 hp. Salmson engine, having crossed the Sahara twice. He was accompanied also by M. Gauron in a Caudron C-161 biplane.

Luft Hansa will have 150 planes available for aerial taxi service April 1, with fare to any point in Germany about 42 cents per mile.

Aeros Proprietary, Ltd., is being formed in Johannesburg to represent the De Haviland Co. in South Africa.

Flying boats with a non-stop range of 2,200 mi. are now being constructed in England, said to be similar to the Supermarine-Napier Southamptons.

The fifth annual Fairey-Napier flight from Cairo to Cape Town, with four planes, has been successfully completed.

Aero Club of Poland is organizing this year's Little Entente Tour, for military planes, to take place between July 19 and Sept. 15, the exact date not having been fixed. Route will be Warsaw, Lvov, Prague, Ageam, Belgrade, Bucharest, Jassy, Posen, Warsaw.

An aviation school was opened in Havana March 3 by the Cuban Curtiss Co. Instructors include three Cuban army aviators.

Mexican Aviation Co. has taken delivery of a Fokker F-10 with three Wasp engines, to be used in the company's Brownsville-Tampico-Mexico City service.

An aircraft factory is to be built at San Luis Potosi by a company capitalized at $25,000 and headed by Gen. Juan A. Cedillo, governor of the state of San Luis Potosi.

Regulations requiring transport companies to build and maintain emergency landing fields at stated intervals along their routes have been promulgated by the department of aviation of the Mexican Ministry of Communications and Public Works.

A patrol of forest areas by Mexican army aviators has been instituted as a means of leasening or controlling fires.

Service between Camooweal and Daly Waters, Queensland, Australia, contracted for by Larkin Aircraft Supply Co. Ltd. is held up by a disagreement between contractors and the government over increasing the subsidy to provide three-engined machines.

Matthews Aviation Proprietary, Ltd., will open a service between Melbourne and Launceston, Australia using Cutty Sark amphibions.

General Aircraft Co. Ltd., Mascot, Australia, is testing a Hermes-engined three-seater, named "Genaco" prior to putting it into regular production.

De Haviland Aircraft Proprietary Ltd. has erected a hanger and work shops in South Melbourne, Australia.

T.A.T.-Maddux Lines has suspended service between Los Angeles, Tia Juana and Agua Caliente Mexico as the permit to operate from the Mexican government has expired and it is said that taxes are unpaid.

Supermarine Builds Three-Engined Air Yacht

SOUTHAMPTON (ENGLAND) — A special three-engined flying boat with luxurious fittings has been built for A. E. Guinness by the Supermarine works of Vickers, Ltd. With Armstrong Siddeley geared Jaguar engines, the boat has a top speed of 120 m.p.h. and cruising speed of 100 m.p.h. Under normal conditions, it is intended to carry six passengers, crew of three, 600 lb. of baggage, with a range of 650 mi.

The total weight loaded is 21,000 lb. Length is 66 ft. 6 in., span is 92 ft. Hull and superstructure are built of duralumin with fittings of stainless steel. Wings are fabric covered. The saloon and cabins are provided with sideboards, dressing tables, bookcases, and wardrobes. There is electric light and a special ventilating system with temperature control. It is the first three-engined plane built by the Supermarine works.

French Lines to Unite

PARIS (FRANCE)—Compagnie Air-Asie and Compagnie Air Union-Lignes d'Orient plan to unite in a new company to be called Compagnie Air-Orient, it has been announced. The managing director will be M. Allegre, who is to make an experimental trip to Saigon soon. The new line to French Indo-China has not been established yet. Much flying of an advance experimental nature has been made on the Beirut-Damascus Bagdad section but the rest of the route from Bagdad to Bangkok has not been organized.

Heinkel Increases Plant

BERLIN (GERMANY)—Increase in orders has forced the Heinkel Works to acquire at Rostock another factory building. The additional space of 60,000 sq.ft. thus provided will be used for production while the original plant at Warmunde will be devoted to design and construction of experimental types. Offices will remain at the old plant, it is reported.

WHAT OUR *Readers Say*

Minor Accidents and Insurance

TO THE EDITOR:

In the January 18th number of AVIATION there appeared an editorial concerning Private Flying Clubs which was read with a great deal of interest by the officers and members of our club. It told very accurately what the flying club situation is in this country. It exhorted all those interested in aviation to give our type of organization a helping hand and I am taking the liberty of soliciting your own aid.

Our Club began operations last May. We had an OX-5 Travel-Air, thirty members, no experience and a lot of determination. At present we have an OX-5 Curtiss Robin as well as the Travel-Air, two private pilots, nine men soloing and the rest well advanced with their dual, a lot more experience and even more determination. We are proud of our record and are looking for big things in the future.

To a certain extent we have been lucky, since the only insurance we carry is against fire on the ground. We have exhausted every means open to us in endeavoring to secure protection against crash, public liability, etc. with very meager success. Mr. Jesse Loeb, Secretary of the Private Flying Clubs Committee of the National Aeronautical Association, has offered us the nearest thing to a workable plan, but we feel it foolish to pay the huge premium necessary under this plan and then be faced with the disadvantage of a $300 deductible clause. We have doped it out that there could be only one kind of loss for which we would collect anything at all, and that is if one of our flyers nosed a ship into the ground with power on and wiped out the ship completely. Everyone knows how desirable insurance is, but to be desirable, it must afford reasonable protection.

Every other department and principle of our organization is sound and it seems a shame that there is no insurance company which will help us round out our club into an outfit which is sound throughout. I ask your assistance in this matter and am waiting to know whether or not you can help.

FRANCIS C. HARWOOD
Vice-President
Chesapeake Flying Club Inc.,
Baltimore, Md.

[Mr. Harwood's views are of interest in that they are no doubt widely shared by would-be members and organizers of private flying clubs. There is a general lack of comprehension of the way in which the insurance business is organized, and of the hazards to which it is subject and which it has to cover by its premiums. The proposal to which Mr. Harwood alludes is, in our opinion, an exceptionally favorable one, and we fear that it will be found quite impossible to secure crash insurance without a deductible clause, even at a considerably higher premium then the N.A.A. plan supplies. The value of the insurance policy is to cover the major crash, not to pay for a succession of minor damages. Even on automobile insurance policies some form of deductible is common. A more general understanding of such points would be decidedly conducive both to the stability and the longevity of private flying clubs, the existence of which without insurance protection must in most cases be precarious.—Ed.]

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Regulating Rates

TO THE EDITOR:

Your January 11th issue has just reached me. "Rate Regulation," page 41, intrigues me beyond measure. Permit a few comments. On first reading of the editorial the impression is gained that rail rate regulation is based upon certain governmental grants, principally in the form of franchises.

I believe that in opening this extremely important subject we had better explore the field with great care and that we had better study our problem with the same industry and thoroughness that we would a problem in aerodynamics. Although the law is infinite it is capable of some systematic research and it is also possible to reduce legal principles to some near-exact statement.

Let me suggest that in the study of regulation we go into the history of the subject first. That we attempt to determine what kinds of businesses have been subjected to regulation, the reasons for the regulation, the extent of the regulation, whether or not aircraft operating business can be included within the regulated class, whether part of the aircraft operating business can be included and part can be excluded, and the extent to which regulation of part or all of the business is justified.

As you no doubt well know the subject of regulation is a very old one. "From the earliest times" (at least so far as English law is concerned) some businesses have been regulated. As late as 1926 the Supreme Court of the United States split on the question of whether or not a state could regulate the price of theater tickets. *(Tyson v. Banton, 1926, 273 U. S. 431)*. I have no doubt that an examination of the 1929 cases will disclose several decisions on this vexing question.

But a slight investigation of the law on the subject will disclose the fact that rate regulation is not of necessity premised on any immunity, monopoly, or grant of power from the state. It is often true that the fact that a regulated utility is possessed of a franchise is established but it is likewise true in innumerable cases that the most stringent form of rate regulation or price fixing is imposed and sustained where no protection from competition exists.

Mr. Chief Justice Taft in *Wolff v. Industrial Court (1922) 262 U. S. 522* can be quoted with benefit:

Page 535. "Business said to be clothed with a public interest justifying some public regulation may be divided into three classes:

1. Those which are carried on under the authority of a public grant of privileges (i.e. franchises) which either expressly or impliedly imposes the affirmative duty of rendering a public service demanded by any member of the public. Such are the railroads, other common carriers, and public utilities.
2. Certain occupations regarded as exceptional, the public interest attaching to which, recognized from the earliest times, has survived the period of arbitrary laws by Parliament or Colonial Legislatures for regulating all trades and callings. Such are those of keepers of inns, cabs, and grist mills.
3. Businesses which though not public at their inception may be fairly said to have risen to such and to have become subject in consequence to some governmental regulation. They have come to hold such a peculiar relation to the public that this is superimposed upon them. In the language of the cases the owner, by devoting his business to the public use, in effect grants the public an interest in that use and subjects himself to public regulation to the extent of that interest although the property continues to belong to its private owner and to be entitled to protection accordingly."

Page 538. "It is very difficult under the cases to lay down a working rule by which readily to determine when a business has become clothed with a public interest. All business is subject to some kinds of public

regulation but when the public becomes so peculiarly dependent upon a particular business that one engaging therein subjects himself to a more intimate public regulation is only to be determined by the process of exclusion and inclusion to gradual establishment of a line of distinction."

Page 539 "To say that a business is clothed with a public interest, is not to determine what regulation may be permissible in view of the private rights of the owner. The extent to which an inn or cab system may be regulated may differ widely from that allowable as to a railroad or other common carrier. It is not a matter of legislative discretion solely. It depends on the nature of the business on the feature which touches the public and on the abuses reasonably to be feared. To say that a business is clothed with a public interest is not to import that the public may take over its entire management and run it at the expense of the owner. The extent to which regulation may reasonably go varies with different kinds of businesses. The regulation of rates to avoid monopoly is one thing. The regulation of wages is another. A business may be of such character that only the first is permissible while another may involve such a possible danger of monopoly on one hand and such disaster from stoppage on the other that both come within the public concern and power of regulation."

The highest court has found this problem extremely difficult. In fact it has in effect said that it will not lay down any hard and fast rules as to either (1) What businesses are subject to regulation and what are not or (2) The extent to which regulation may go, once regulation is admitted. The case must be brought up and tried on its merits.

An examination of the cases will not hinder our proper determination of a policy in seeking legislation, however. As to analogies in the eminent domain—regulation situation see *Wingrove v. Public Service Commission 74 West Virginia 190, 81 S E 734* in which case the lack of the power of eminent domain in a mining company selling electricity was held to be a mere inconclusive circumstance and not determinative of the question of whether or not the company could be regulated.

As to railroads and other transportation companies permit me to suggest what I believe to be the underlying reason justifying their regulation, their classification as businesses affected with a public interest. Their universality. Transportation companies if not local of necessity affect the interests of at least two communities. Generally they are the very life blood of commerce of great blocks of territory and large portions of the total population. Their power actual or potential, is too great to leave unregulated. In urban transportation it can be said that street railways and bus lines affect the interests and well being of too great a portion of the population to go unregulated. Expediency demands that the public's interest be not subjected to the whim or caprice of public utility operators to say nothing of their greed.

I certainly applaud your attitude regarding the certificate of convenience and necessity. Certain it is that the air transport industry can not at this time stand unrestricted competition. The recent announcement of the Post Master General to the effect that legislation would soon be introduced in Congress authorizing the letting of mail contracts on the space basis to lines in operation will accelerate the establishment of new lines as nothing before has done. So some kind of regulating legislation should be passed before long.

THOMAS H KENNEDY
Los Angeles Calif

[Mr Kennedy's analysis of the legal principles involved in the regulation of air transport is worthy of the most careful consideration as was a lengthy brief which he prepared on the same subject and which was reproduced in the Congressional Record for October 14 1929. We note with satisfaction that he concurs in our view that a reasonable regulation of unreasonable competition is both practicable and desirable. In urging that the regulation of railroads depended largely on the special franchise that they receive from the state and upon their mutually exclusive nature, we had in mind the principles of equity more than those of law. It may be possible to make a legal argument in favor of the propriety of regulating rates on air lines but there is far less logical reason for it than in the case of the rail carriers and we hope that logic will prevail. There are many things which could be done legally but which *should* not be done at all.—Ed.]

Aerial Advertising Over N. Y.

TO THE EDITOR

Will the proposed aviation law for New York City drafted by Commissioner Whalen and presented to Mayor Walker this week become a reality as presented?

Commissioner Whalen would prohibit aerial advertising over New York City.

Aerial advertising presents a source of revenue worthy of recognition and it seems to me that some steps should be taken to prevent the passing of any law that cuts off aviation revenue. Aerial advertising is a legitimate aviation enterprise and should be given serious consideration.

Commissioner Whalen should confine his laws to facilities and equipment rather than the nature of the business that the plane is engaged in.

I am interested in aerial advertising and I would be pleased to hear from you as to the possibilities of success of Mr Whalen's Law.

LOUIS O GLATZNER
Rochelle Park N J

[The legitimacy of aerial advertising, in our opinion depends entirely upon its form and upon the good sense of those who operate it. It can be entirely unobjectionable and it would be a pity to interpose a categorical prohibition by law. For the demand that has been made for such a general prohibition, however, the advertisers can thank certain reckless or overconfident pilots who have elected to display their poor judgment or their comparative incompetence over metropolitan areas, and especially certain of their own number who have behaved with barbaric disregard of public sentiment and made intolerable nuisances of themselves. No civilized community will tolerate any form of advertising which makes the day unbearable and the night hideous, or which intrudes an unnecessary interference upon those engaged in any harmless pursuit.—Ed.]

Editorial Comment
FROM THE DAILY PRESS

"Anything Except Fly"

AIRPLANES like automobiles, are being offered on deferred payment plans. Anyone who has a few hundred dollars and wishes to obligate himself for a number of subsequent payments may become the possessor of a ship. Manufacturers expect the sales of these machines to progress rapidly under this scheme since the price is almost no bar to possession. In addition training is available to all who care to become pilots. Schools have been established at every city of any size and no one has to travel far to obtain the training needed. In this also, the money element has been reduced to minimum importance as a handicap. Commercial aviation has been growing by leaps and bounds and all this activity in the field of private flying is considerad of aid since it stimulates interest in all phases of aviation. But selling planes on the installment plan and cutting rates on passenger and freight service does not solve aviation's problem. A New York

banker recently expressed the attitude of many when he said "I'll do anything for aviation except fly." Too many people are anxious to see the industry develop and have it available but are unwilling to make active use of it.—NEBRASKA STATE JOURNAL

* * *

Brought Right to Our Doors

THE BAY AIR FERRY SERVICE brings aviation right on to the front lawn so to speak. Many people have traveled by plane, of course, yet their number measured by the population has been comparatively small. We have become air minded, yet it has seemed that airplanes always started from somewhere else.

But now, with a fifteen-minute scheduled service, that will cross the bay in six minutes starting from one convenient and central point and landing at another equally convenient flying is getting on to a basis comparable with street car riding.

The effect of this service upon air transport business generally should be beneficial. It will accustom many persons to traveling by air and when the occasion arises, make them patrons of the longer distance flying services. The venture is, in a way, a forecast of what we may expect when flying becomes more generally used by the traveling public. Practical reasons may forbid the big liners starting from central locations, but there may well be feeder taxi services. These we shall see, no doubt when the demand justifies the creation of facilities.

—SAN FRANCISCO CHRONICLE

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In the Air

[The following was found strangely enough in a New York theater program. We feel that our readers will find several of the points concerning the status of airmindedness rather interesting. Anthony Hazard is the author of the piece.—ED.]

ON FRIDAY of this week the Aviation Show (the recent American Legion Exhibit) is scheduled to open at the Grand Central Palace. If you go there you can see the works—big planes, little planes, equipment, and the various what-nots that are associated with aeroplanes. If you keep your ears open you will hear aviators talking shop—they seldom talk anything else—and if you tune yourself properly you will be aware of a vast amount of self-consciousness. Aviation is at present the most self-conscious activity extant.

The purpose of this display is partly to give the boys a chance to get together and show what they have and partly to make the citizenry of this nation "air-minded"—mostly the latter.

And now tell us, mister, why is the populace not airminded? All right. I've got the time. I'll tell you. It is not due to a feeling of lack of ability to learn to fly, because the apparent truth is that anyone with a normal physical make-up can master the art. The embryo American airman is not afraid of himself and his own ability. He is afraid of the machines given him to fly. It is all very well to tell him not to climb too steeply and stall, or not to try and stretch his glide when his engine fails, or not to do this, or not to do that. All very good information, and fairly simple to follow out—but how about that fellow in Washington, a crack naval flyer, who got killed, and how about all those army men, and how about the air mail men etc etc, through a long list of men who presumably would have obeyed all the rules and who crashed nevertheless? How about that ominous line, "the plane went into a spin"? The Department of Commerce's silly policy of secrecy on the cause of air accidents doesn't answer these questions.

Building, flying and giving a prize to a so called "fool proof" plane is no answer—at least at this time. It lies on the wrong psychological track. Build one that will convince the land bound citizen that with proper handling it will not do something mysterious and crack up the most skilled pilot in the air. John K. Citizen is not convinced that such a plane exists. Make it clear to him that as long as he obeys the rules of flight he is safe, and you will go a long way to making him air minded. Take out the element over which he has no control and you will clutter the clouds with aeroplanes.

About 30 000 people were killed in surface transit accidents last year.

People realize that all but a tiny percentage of these accidents were caused by human error. It is a happy optimism of individuals that they are not prone to make mistakes—that they will not be listed among this year's 30 000. They are not afraid of themselves, and they are certainly not afraid of their automobiles, or trains or buses or boats.

Get people in the same frame of mind about flying and aeroplanes and the trick is turned—America is air-minded. Until that is done, aviation shows will merely satisfy curiosity and not get people into the air. Several months ago I harped on taking the romance out of flying, and injecting the prosaic. I stick to my story, that's how to make the country really air-minded.

New Volumes
FOR THE SHELVES

A Study of Air Law Problems

AERONAUTICAL LAW, *By W. Jefferson Davis. Parker, Stone & Baird Co., Los Angeles, 1930, pp 541*

FOR MORE THAN ten years past the author of this book has actively engaged himself in the study and promulgation of law relating to aeronautics. His membership on the Air Law Committee of the American Bar Association Service 1921 is indicative of the interest and attention he has devoted to this field.

No book on a subject as new as air law should be judged on the same standards as would be applied to a work in a field where the law is already settled. Of the many problems and specific questions raised very few have so far been decided in the adjudged cases. New issues not yet even suggested are bound to arise with further developments in the new science of the air. It follows necessarily that many questions can at present be answered only by application of the principles established in other fields of the law in fact situations believed to be analogous. A still larger number cannot be answered at all, at least not with any degree of assurance.

The author's classification is as follows: (1) Federal and State Control of the Air, (2) Control of Airports, (3) Regulation of Aircraft Carriers, (4) Liability and Insurance, (5) Federal and State Regulation of Aircraft. Under the first heading, such important questions as property rights in air space and governmental regulation of air commerce are discussed. Under the second, the scope of municipal ownership and regulation of airports and the liability of airport operators are considered. Part three deals with aircraft as common carriers and state taxation and control over rates and sale of securities. Part four raises the problems of liability of owners and operators of aircraft, and how far rights under insurance policies are affected by engaging in aviation. The last section deals generally with international, federal, and state regulation over aeronautics.

The book contains a great deal of valuable material. It is undoubtedly the most complete work on the subject which has appeared up to the present time. To anyone approaching a particular question the author's analysis and citation of authorities relating thereto will offer material assistance. The digest of cases arranged according to subject matter is extremely helpful. The readability of the book would be greatly improved

by decreasing the amount of quoted material and placing the voluminous texts of the statutes and international agreements in an appendix.—LAWRENCE P. SIMPSON, *Air Law Review, N. Y. University.*

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Rigging Maintenance

AIRPLANE MECHANICS RIGGING HANDBOOK, *by Rutherford F. Hartz and Elzor E. Hall, The Ronald Press. 1930, 267 pages. $3.50.*

HERE is a book containing a great deal of practical information for the man who is concerned with the rigging aspects of aircraft maintenance. The authors served in the Army Air Service during the World War and have had close contact with the problems they write about from the mechanic's standpoint, as well as from that of the pilot.

The manual confines itself to accurate methods of operation in the shop and to practices insuring safety and efficiency. It does not go into the theoretical part of aeronautics, but is a direct exposition of how and what to do or what to avoid in handling the airplane. The authors explain that they have dealt rather lightly with the subject of wing practices on all-metal planes because there are several books available treating this in the degree of detail it deserves but which space does not permit in the volume they have prepared.

The rigging of wooden and metal airplanes is dealt with extensively in separate chapters. From then on the authors discuss the handling of wooden struts and spars, controls and the corrections for instability, the important manner of inspection, the care, preservation and repair of fabrics, the selection, care, protection and use of wood and glue, the various types of special woodworking equipment, and the subjects of airplane wire, dopes and doping. About fifteen pages, constituting a complete chapter, are devoted to metal airplane parts. In the last chapter the care and packing of parachutes of two types is discussed in detail.

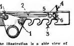
The volume is written in an interesting style and with a clarity of expression which contributes notably to its effectiveness. Photographs and drawings are liberally distributed to illustrate important points. It promises to be of considerable use to the airplane mechanics already licensed by the Aeronautics Branch, and also to the students of this and allied subjects.—CHARLES H. GALE, *Assistant Editor of* AVIATION.

New Patents

Rudder-Bar Foot-Rest

1,745,401. RUDDER-BAR ADJUSTABLE FOOT REST FOR AIRCRAFT. ERNEST G. MCCAULEY, Dayton, Ohio. Filed Sept. 3, 1928. Serial No. 304,314. 5 Claims. (Cl. 244—25.) (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.)

IN ORDER to adjust the foot rests carried by the rudder-bar to the feet of the pilot, these foot-rests form the lower member of a rectangular frame whose side members have slots in which engage bolts extending through



The illustration is a side view of the foot rest frame showing bolts 1 engaging in slot 2, tongues 3, foot-rest 4 pivoted at 5, and locking nut 6.

plates fixed to the rudder bar. When the bolts are loosened the foot-rest frame is designed to be slid toward or away from the pilot, as desired. The side members of the foot-rest frames have a series of tongues intended to be swung over bolts on the fixed plates when the proper setting of the foot-rests has been determined. The lower member of each foot-rest is pivoted so that it may be turned to such position as to permit the pilot's heel to rest on the floor. When adjusted, the lower member is designed to be securely bolted in position.

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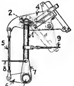
Brake and Rudder Pedal

1,746,068. COMBINATION BRAKE AND RUDDER PEDAL FOR AIRCRAFT. ROBERT J. MINSHALL, Seattle, Wash., Assignor to Boeing Airplane Company, Seattle, Wash. Filed Aug. 30, 1928. Serial No. 302,912. 8 Claims. (Cl. 244—89.)

A RECTANGULAR BAIL is fixed upon a transverse shaft in the lower part of the fuselage. On the upper bar of this bail is pivoted a pedal which is connected to the brake through a link and bell-crank rotatable on the lower bar of the bail. The side members of the bail are connected to the rudder cables. This construction is designed so that the pilot may swing the pedal around the upper bar of the bail to actuate the brake, or at the same time swing the entire bail around the transverse shaft to actuate the brake and the rudders, or swing the bail around the transverse shaft without swinging the pedal around the upper



The illustration shows side member 1 of the bail, upper bar 2, lower bar or transverse shaft 3, pedal 4, link 5, bell-crank 6, 7, brake cable 8, and rudder cable 9.

bar of the bail to actuate only the rudders. Two parallel transverse shafts are geared together for equal and opposite movement, and on each shaft is mounted two similar pedals for the purpose of permitting either of two pilots to operate the controls.

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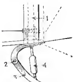
Steerable Tail Skid

1,746,858. STEERABLE TAIL SKID FOR AEROPLANES. LESTER GUY QUIRBY, Huntingdon, Pa. Filed March 15, 1929. Serial No. 347,258. 3 Claims. (Cl. 244—2.)

THE TAIL SKID is fixed to the shaft of the steering rudder so that it will turn in the same direction as the rudder turns. The tail skid is in the form of two curved members, the



The illustration shows steering rudder post 1, upper member 2, lower member 3, and shock-absorbing device 4.

upper member fixed to the steering rudder post, the lower member pivoted on the upper member, and a shock-absorbing device positioned between and connecting the two members.

THE BUYER'S LOG BOOK

G. E. On-Course Lights

THE type AH-2 Novalux on-course light produced by the General Electric Company, Schenectady, N. Y., is for use on airways and at airports to indicate the direction and location after dark. The light is 18 in. in diameter and is equipped with a doublet lens and a special reflector of silvered optical glass. The front lens is of the semaphore type and is sealed in the door frame with a durable cement. The casing and door frame are made of non-ferrous alloys while the swivel and trunnion bracket and supporting base are of hot dip galvanized steel. A clamping lever permits easy adjustment of the unit. The center of the beam should point 1½ deg. above the horizon.

A 500 watt, 110 volt, clear Mazda lamp is used. Focusing is made simple by the rocker-type mechanism that adjusts the position of the mogul socket and can be operated from outside the casing. Electrical connection is made by means of a twin conductor cable that passes through a stuffing bushing at the bottom of the casing.

Take About Sander

TO MEET THE DEMAND for a lighter and more compact sander of higher speed the Porter Cable Machine Company has just placed on the market a

The Take-About Sander

new Take About Sander Type B-7. This is a portable, hand built model used for such work as finishing and refinishing desks and tables, polishing name plates, sash and doors, and metal furniture. The belt running in a straight line secures a straight grain finish. A belt also can be used on slightly curved surfaces, and versatility in work is obtained by changing the abrasive belt.

The sander has a 220 volt, 180 cycle, 3 phase motor rated at 1½ hp. and developing a maximum of 1.9 hp. The belt is 3 in. x 25¼ in. with a speed of 1,800 ft. p.m. The pulley has a diameter of 2¾ in. Equipment includes 6 belts, ½ in. felt covered shoe and 20 ft. rubber covered four conductor cable without plug. The dimensions of the sander are 9 in. x 6 in. x 15 in. It weighs 21 lb.

Parker Vise

A SPECIAL VISE for the airplane industry has lately been developed by the Charles Parker Company, Meriden

The Parker vise

Conn. The vise has large renewable steel jaws milled and pinned on, while a solid underportion and a solid steel bar cast in the slide the entire length give the tool great strength. The handle stays in place anywhere due to a set screw and spring in the handle. Three sizes are available, No. 294½, No. 295 and No. 296. No. 294½ weighs 68 lb. and has a 4½ in. jaw, No. 295 weighs 113 lb. and has a 5 in. jaw while No. 296 has a weight of 177 lb. and a 6 in. jaw.

Lubri-Meter

A GAUGE known as the lubri-meter has been recently developed by the American Viscosimeter Company, New York City to show the actual state of the oil that is passing through an engine thus preventing burnt out bearings, scored cylinders and excessive wear. A small portion of the oil delivered from the pump under a variable pressure is passed through a jet where it undergoes a dynamic pressure loss proportional to the square of the speed of flow. The pressure drop activates a maximal valve operating within very close limits and thereby holds the pressure drop and the oil flow to a constant value, which is attained even at idling speed of the engine. This constant oil flow returns to the zero pressure of the crankcase through a friction tube, the resistance of which sets up a pressure head directly proportional to the oil viscosity. A pressure gauge installed in the oil passage ahead of the friction tube can therefore be calibrated in absolute viscosity units.

TRADE CATALOGS

▶ *Desoutter sports coupe.* The Desoutter Aircraft Company Ltd. recently published a booklet containing descriptive material on the Sports Coupe and a summary of the advantages of this plane.

▶ *Fafnir bearings.* A new booklet entitled "Fafnir Bearings for Aircraft" has just been issued by the Fafnir Bearing Company for distribution in the aviation industry. The publication explains ways in which ball bearings have been used in connection with airplane control mechanism as an added safety medium. Charts and data sheets relative to the advantages of ball bearings in different parts of the airplane are included.

▶ *The metalclad airship ZMC 2.* The Detroit Aircraft Corporation has recently published a bound pamphlet of the above title. The book describes in detail the ZMC 2 from its inception to the delivery flight. General details of construction are included. Future plans of the corporation in the lighter than air field are presented in the closing chapters.

Fisk Airplane Tires

THE Fisk Rubber Company, Chicopee Falls, Mass., announces the addition of a line of airplane tires now being made in sizes up to 8 ft. for use on all but the largest planes. Most of the new tires are of four-ply construction and are built by the semi-flat drum method. All-Cord fabric is used for the carcass and the Fisk multiple cable bead is also an integral part of the bead construction. This product has passed the U. S. Army specifications including bursting and deflection tests.

Fisk tire and tube

SIDE SLIPS

By
Robert R. Osborn

For years now aviation has had to compete with the radio for popularity with the general public in the newspapers and the stock market. At a time like this, when the public seems to have become a little less air-minded and a little more radio-minded it is tough to have a perfectly good news item taken away from us by a misguided headline writer

"Test U S Army Ships for Static" was the heading placed on the following article,—"W E. Savage stress engineer from the Materiel Division, U S Air Corps, is at the Boeing Airplane Company conducting static tests on the new Boeing Army fighting planes"

Discovered by Mr R B of Seattle, Washington, in the *Seattle Post-Intelligencer*

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Miss L. M of Garden City, New York, protests bitterly against the fact that many people have become so sentimental over aviation that it seems to have arrived at the "baby talk" stage. She quotes from an article in the New York *Times* describing the recent winter maneuvers of the U. S Army First Pursuit Group "Flying much of the time in temperatures well below zero, facing day after day of storm and suffering from frozen faces, hands and feet, seventeen of the eighteen little Curtiss Hawk pursuit planes made the tour and came through in good shape"

"How" asks Miss L M, "can we keep the faces, hands and feet of seventeen itsie bittsie Hawks warm?"

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Everyone knows that airplane production conditions are in fairly bad shape just now, but that's no reason for the newspapers to get sarcastic and funny about a serious matter H E W reports the following clipping from the Air News column of the *Dayton News*

"New York, Jan. 16th—The Ford Motor Co., it was reported today, will resume capacity operations of its airplane manufacturing division on February 31st."

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Our Hangar Flying Department

The following story by O P H comes to us through S.F of the Roosevelt Field Flying Service, who was just as much impressed by the story as we were It seems that O P H. used to fly the Boeing run and claims that some of the windy weather obtainable in Denver makes the worst winds anywhere else seem like gentle spring zephyrs The winds were so bad in fact that they weren't able to devise a wind sock which would stand up until they finally made one up out of a three foot length of steel trace chain. When this wind sock was blown straight out it was still all right to fly, but, so far, they had always called off flying when the wind started snapping links off of the chain

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We seem to be getting more and more evidence from all sides to prove that cows are completely air-minded and have been enthusiastically so for some time. Further information on the gastronomical delights that aviation holds for the humble cow come from E. W R. of Cincinnati, Ohio

"Your cow stories in the January 11th issue do not disclose the apparent fondness of the lady bovine for gasoline Some years ago two Cincinnati aviators were bringing a plane to Cincinnati from Memphis Engine trouble caused a forced landing in an Indiana pasture Thinking it might be dirty gasoline causing the engine trouble, they drained the tank into a bucket from their kit, and sought the nearest oil station for a fresh supply In the meantime Bossy sighted the bucket and emptied the contents into one of her several stomachs When they returned with fresh gas they found a dead cow and a furious farmer with a constable who demanded payment for the cow The money not forthcoming, the constable took them to the village jug, but permitted them to 'phone Cincinnati for relief C. E. Lay, manager of their concern, after considerable trouble got the money on the way by wire and they were released."

You remember the famous story about the mysterious accident that happened to a ship which had been designed and was being tested by the Army Engineering Division at McCook Field—the ship that was left standing on the field while the crew went out to lunch, and when they returned the landing gear had collapsed? Well. we think we have a possible solution for the mystery at last—a cow ate the bolts out of the fittings

• • •

W K of Daytona Beach, Florida, quotes the following from an interview given to the reporters by a young lady who has just returned from looking over the aeronautical situation in England.

"The greatest difference between the American and British ships does not lie in the outward appearance but in the inward working of the craft. This is powerfully illustrated by the action of the different ships when out of control The British ships fall head on in a 'Spinning Nose Dive' while the American planes skid backward into the deadly 'Tail Spin'"

We don't take this as a reflection on American manufacturers, we'd say it was just another example of the funny way they do things in England,—just imagine having ships that would fall head on in a Spinning Nose Dive Silly, we calls it

• • •

Mr G K. G of Lakewood, Ohio, sends in a clipping from a contemporary aeronautical magazine which qualifies one of its writers as having been "Chief Metallurgist of the American Citrus Engines, Inc."

Readers will be permitted to make their own comments in this case If the readers will only try making a few comments for themselves, easy ones at first, but taking on at least one more comment each week, possibly Aviation can do without this column altogether very soon.

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The complete success of the Third All-American Aircraft Show, at Detroit, April 5 to 13, is already assured. Every available inch of the 200,000 square feet of floor space in the new City Hangar where the Show will be held has been reserved. The list of exhibitors has surpassed all expectations.

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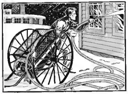

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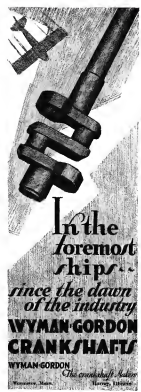

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Professional Services

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